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AN EPITOME OF NAVIGATION:

CONTAINING

The Doctrine of *Plain* and *Spherical Triangles*, and their Use and Application in *Plain Sailing*, *Mercator's Sailing*, and *Great Circle Sailing*, as also in *Astronomy* and *Geography*, and Rules for finding the *Variation of the Compass*, and correcting the *Course*.

TOGETHER WITH

Tables of the Sun and Stars *Right Ascension* and *Declination*, Of the *Latitude* and *Longitude* of Places, Of *Meridional Parts*. Likewise a *Traverse-Table*, A *Perpetual Almanack*, and other things very useful in the Art of *Navigation*.

And the *Logarithm Sines* and *Tangents*, with the *Logarithms* of Natural Numbers, from 1 to 10000, according to those exact Tables formerly set forth.

By HENRY GELLIBRAND.

This Edition (with many new Additions) is carefully
Corrected by EUCLID SPEIDELL,
Student in the MATHEMATICKS.

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The BOOKSELLER to the READER.

Having formerly Printed Mr. Gellibrand's Institution Trigonometrical, with those exact Tables of Natural and Artificial Sines and Tangents, and Logarithms of Natural Numbers, which were generally accepted and well approved of by most that understood the Mathematicks: and it being now scarce and out of Print, I had thought to have reprinted it as formerly, but understanding that Mr. Gellibrand's Institution was somewhat obscure, and besides contained nothing of the Use and Application of Triangles in the three kinds of Sailing, and for this reason not so proper for Seamen, as this which I here present thee with; I altered my intentions, and have instead of Mr. Gellibrand's Institution, collected the Doctrine of Plain and Spherical Triangles in a plainer Method, and have therunto added the Use and Application of Triangles in Plain Sailing, Mercator's Sailing and Great Circle Sailing; likewise in Problems of Astronomy and Geography, wherein is shown to find the Sun's Declination, Right Ascension, and Oblique Ascension, the Hour of Sun Rising, the Hour at any Altitude or Azimuth, and the Azimuth and Altitude at any Hour, the Sun's Amplitude and Azimuth, and thereby the Variation of the Compass, and how to rectify the Course thereby, with many other things useful in the Art of Navigation, likewise I have added these useful Tables, that is, a brief Table of Meridional Parts that may be used to every Minute of Latitude, a Table of the Sun's Right Ascension, a Table of the Sun's Declination exactly calculated, a Table of the Latitude and Longitude of the Principal Ports, Head-lands, and Islands in the World, an exact Table for the easy working of a Traverse; together with a Perpetual Almanack. And lastly, I have hereunto annexed Tables of the Logarithm Sines and Tangent, together with a Table of the Logarithms of Natural Numbers from 1 to 10000, which are carefully corrected according to Mr. Gellibrand's Tables.

To the Reader.

In this Edition you have great Alterations and Additions, viz. The Construtions of the Geometrical Problems are wholly new, and expressed more suteable and agreeable to the old Diagrams. The Triangles for the Doctrine of Plain Triangles, both Right-angled and Oblique-angled, marked and figured for the Data and Quæsitæ, more intelligible and significant to their respective Cases throughout. In Right-angled Spherical Triangles you have a particular Triangle, suteable to the respective Data and Quæsitæ thereof, for all the 16 Cases, and marked and figured accordingly. So likewise have you 12 Triangles, for the 12 Cases of an Oblique Spherical Triangle, marked and figured according to their respective Data and Quæsitæ. For Plain Sailing you have 6 Triangles, marked and figured according to the Tenor of the Problems: Two things by inspection, being understood to be sought or found, in each of the six Common Problems of Plain Sailing. Lastly, You have 5 Double Triangles, for Mercator's Sailing; whereas in the former Editions there was but one, each of these is so marked and figured, that by inspection you may both understand what is given and required, in each Case corresponding to the Text, with Reductions suteable to the Data throughout; whereby you may know most readily and easily when to use the greater or lesser Triangle for the Solution of the respective Problems.

To conclude, You have the general Scheme for Great Circle Sailing, defin'd and explain'd, which was much wanting in the former Editions: The whole Book Corrected and Amended carefully throughout, and the Triangles engrav'd on two Copper-Plates, the Prints thereof lying open and visible, you may make use of any part thereof; so that I think there is no Book of Navigation of this Volume extant that contains so much useful Matter as this Treatise, which, that it may turn to the Benefit of both Buyer and Seller, is the Desire of

Your Friend to serve you,

RICHARD MOUNT.

CHAP. I.

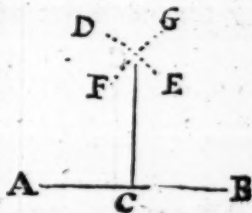
Containing some necessary Geometrical Problems.

PROB. I.

To Erect a Perpendicular on the middle of a Line given.

LET the Line given be AB, and the middle point be C.

Set one foot of the Compasses in A, and extend the other foot to some distance greater than AC, and with that distance make aloft the Arch DE, with the same distance set one foot in B, and cross the said Arch DE, by making the Arch FG, by the place of Intersection of those two Arches and the point C, draw the Line to G; so shall this Line be the Perpendicular as was required.



PROB. II.

To erect a Perpendicular on the end of a Line given.

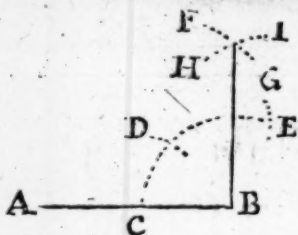
LET the given Line be AB, and on the end B 'tis required to raise a Perpendicular.

Set one foot of the Compass in B, and with any distance make the Arch CDE; then with the same distance,

B

setting

Geometrical Problems.



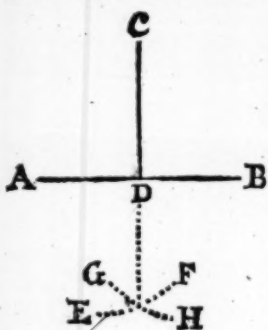
setting one foot in C, cross that Arch in D, and keeping one foot there, with the same distance make aloft the Arch FG, and also cross the Arch CDE in E, and taking off the Compasses from D, set one foot of the Compasses in C (keeping them at the same distance)

with the other foot make aloft the Arch HI. Lastly, From the Intersection of the Arch HI with FG, draw a Line to the point B, so shall this Line be the Perpendicular upon the End B, as was required.

P R O B. III.

To let fall a Perpendicular from a Point over the middle of a Line given.

LET the given Line be AB, and the point aloft over the middle thereof be assigned C.



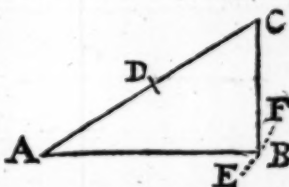
Extend the Compasses from A to C, and keeping one foot in A, with the other make the Arch FE; then with the same distance set one foot in B, and with the other make the Arch GH. Lastly, From the point C, and the Intersection of the Arches GH and FE, draw the Line CD, so shall CD be the Perpendicular let fall as was required.

P R O B.

PROB. IV.

To let fall a Perpendicular from a Point assigned, near or directly over the end of a Line given.

LET the given Line be AB, and the Point assigned C. Draw the Line CA, which divide into two equal parts in D; then with the distance DA, setting one foot in D, with the other make the Arch FE, crossing the given Line in B; then from C draw the Line CB, which shall be a Perpendicular let fall as was required.



PROB. V.

To draw a Line Parallel to a Line given.

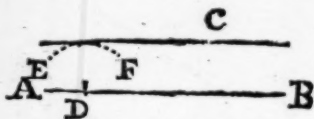
LET the given Line be AB. With any distance of the Compasses; setting one foot in C taken at pleasure, with the other make the Arch E; then with the same distance likewise at D, set one foot, and with the other make aloft the Arch F. Lastly, By the tips of the Arches E and F, draw a Line, which shall be a Parallel to the Line given, as was required.



P R O B. VI.

To draw a Line Parallel to a given Line, which shall pass through a Point assigned over the given Line.

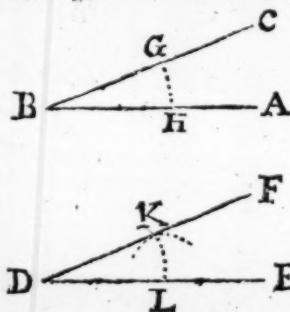
LET the given Line be AB, and the Point assigned C. Set one foot of the Compasses in C, and extend the other to the nearest distance of the Line AB; then taking off the Compasses, and keeping them at the same distance from any Point taken towards the end A of the given Line, as at D, and setting one foot in D, with the other make the Arch EF. Lastly, By the point C, and the tip of the Arch EF, draw a Line, which shall be parallel to the given Line AB, and pass through the assigned point C as was required.



P R O B. VII.

An Angle being given, to make another equal thereto.

LET the given Angle be ABC, and 'tis required to make another equal thereunto.



Draw the Line DE at pleasure; then setting one foot of the Compasses in B with any distance, make the Arch GH crossing BC in G, and also crossing BA in H; then keeping the Compasses at the same extent, set one foot in D, and with the other make the Arch KL: That done, take off the distance GH, and with this distance

Geometrical Problems.

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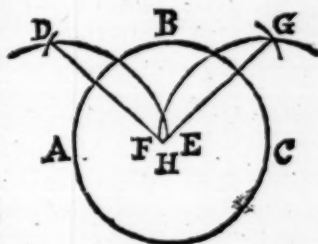
stance, setting one foot in L with the other Cross, the Arch LK in K. Lastly, By D and K draw the Line DF, so shall the Angle EDF be equal to the Angle ABC as was required.

P R O B. VIII.

To bring any three Points, not lying in a right Line, into the Circumference of a Circle.

LET the three Points be ABC, and 'tis required to make a Circle to pass over them.

Set one foot in A, and extend the other to more than half towards B; and with that distance make the Arch DE; then with the same distance, setting one foot in B, with the other cross the Arch in D and E, and draw DE long enough: That done, if the Compasses likewise stand



at more than half the distance of BC, set one foot in C, and with the other make the Arch FG; and with the same distance, setting one foot in B, with the other cross the said Arch FG in F and G, and draw the Line FG to cross DE in H, so shall H be the Center: Therefore setting one foot in H, and extending the other to either A, B or C, with the other make a Circle, which shall pass over all the three Points assigned A B C as was required.

C H A P. II.

*Containing the Doctrine of Plain Triangles,
Right-Angled and Oblique.*

Triangles are either Plain or Spherical.

Of Plain or Right-lined Triangles.

HERE first take a few general Rules about them.

1. A plain or Right-lined Triangle, is a plain Figure contained or comprehended within three right or streight Lines, joyned together with three Angles or Corners.

2. These plain Triangles are either Right-angled, that is, having one right Angle; or else Oblique-angled, that is, without a right Angle; and having all the three Angles either acute, that is, less than 90° . or else one of them obtuse, that is, more than 90° .

3. In either sort of these Triangles, the three Angles are always equal to two right Angles, that is, 180° .

4. In a Right-angled Triangle, the right Angle being always 90° . the other two Angles make also just 90° . in such manner that one is the Complement of the other, so that one of them being known, the other is also known.

5. The Lines about the right Angle, some call them Sides, some Legs: But in Right-angled Triangles. for better distinction, we will call BA the Bottom-line, the *Base*; AC the Upright-line, the *Perpendicular*; and EC the Slope-line, the *Hypotenuse*.

6. Every Triangle hath six parts, to wit, three Sides, and three Angles, and these are all proportional one to another, so that any three of them being known, the other three may be found out; unless it be the three Angles of a plain Triangle, which only shews the Proportion of the sides, but you may make one side what length you will.

(I.) of

Of Right-angled Triangles.

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(I.) Of Right-angled Plain Triangles.

CASE I. Plate I. Triang. I.

The Angles and one Side of a Right-angled Triangle being given, to find the other Sides.

Example. In the Right-angled Triangle BAC, the Angle at A being known to be a right Angle or 90 d. and the Angle at B being known to be 36 d. 52 m. and the Side BC being known to be 350 inches, feet, yards, poles, miles, leagues, or any other kind of measure; How may I find hereby the other two sides?

The Angle at C is known by the fourth Rule before-going; and so this being a Right-angled Triangle, the Angle at C is the Complement of the Angle at B. Take therefore the Angle B, 36 d. 52 m. out of 90 d. and there rests for the Angle at C, 53 d. 8 m.

To find the side CA, work by this proportion.

*As the Sine of any Angle to the Side opposed thereunto:
So is the Sine of any other Angle, to the Side opposed thereunto.*

And so on the contrary, *As any Side, &c.*

So that in this Triangle BAC, having the side BC 350 opposed to the Angle at A 90 d. you may thereby find the side AC, which is opposed to the Angle at B, that Angle being known to be 36 d. 52 m. for,

<i>As the Radius or Sine of the Angle at A</i> 90 d.	10.0000000
<i>To the opposite Side BC,</i> 350	2.5440680
<i>So is the Sine of the Angle at B</i> 36 d. 52 m.	9.7781186
<i>To the opposite side AC,</i> 210	12.3221866

Add the second and third Numbers together, and from the Sum subtract the first, which because it is the Radius,

B 4

it

Of Right-angled Triangles.

It is done by cancelling the first Figure 1, so the Remainder is 2.3221866, which is the Log. of 210 for the side desired.

Plate I. Triang. I.

Thirdly. By the same Rule you may find the side BA, which is yet unknown, by its proportion to the opposite Angle at C, which is 53 d. 8 m.

<i>As the Radius or Sine of 90 d.</i>	10.0000000
<i>To the side opposed BC, 350</i>	2.5440680
<i>So the Sine of the Angle C, 53 d. 8 m.</i>	9.9031084
<i>To the Side BA, 280</i>	12.4471764

Which cancelling the Radius, the Remainder is the Logarithm of 280, for the Side BA, and thus you have all the six parts of the Triangle.

CASE II. Plate I. Triang. II.

Two Sides, one of them opposite to the right Angle, being given, to find the Angles and third Side.

The right Angle being opposed unto one of the given Sides, you may work by the proportion of the opposite Sides and Angles, for,

As any known Side, to the Sine of the Angle opposed thereunto: So is any other Side to the Sine of the Angle opposed thereunto.

Example. In the Triangle AEC, let the two given sides be AB, 280, and EC, 350, which side EC, is opposed to the Angle A, being known to be 90 d.

First, To find the Angle at C, opposed to the side AB,

<i>As the Side EC 350 Log.</i>	2.5440680
<i>To the Sine of the opposite Angle A, 90 d.</i>	10.0000000
<i>So the side AB, 280</i>	2.4471580
	<hr/>
	Sum 12.4471580
<i>To the Sine of the Angle C, 53 d. 8 m.</i>	9.9030900
	Add

Of Right-angled Triangles.

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Add the second and third Numbers, and from the Sum thereof subtract the first, the Remainder is the Sine of the Angle desired, which is *53 d. 8 m. almost.*

Secondly, Now this Angle being known, the Angle at B is the Complement thereof, which is *36 d. 52 m.*

/ Plate I. Triang. II.

Thirdly, For the side CA, having found the opposite Angle at B to be *36 d. 52 m.* you may find it as before in the last Proposition.

<i>As the Radius or Sine of the Angle at A</i> <i>90 d.</i>	10.0000000
<i>To the opposite side BC</i> <i>350</i>	2.5440680
<i>So is the Sine of the Angle at B</i> <i>36 d. 52 m.</i>	9.7781186
<i>To the side AC</i> <i>210</i>	12.3221866

Case III. Plate I. Triang III.

In a Right-angled Triangle, the two sides including the right Angle being given to find the Angles and third side.

Example. In the Triangle BAC, suppose the side BA to be 280, and the side AC to be 210, and the Angle A between them to be a right Angle *90 d.* to find the other parts of this Triangle.

You may make either side the Radius, but we will suppose the side BA to be the Radius; so the side AC is the Tangent of the Angle at B, and the Angle at C is the Complement of the Angle at B. First, To find the Angle B.

<i>As the one side BA,</i> <i>280 Log.</i>	2.4471580
<i>To the other side AC,</i> <i>210</i>	2.3222193
<i>So is the Radius Tang.</i> <i>45 d.</i>	10.0000000
	Sum 12.3222193

<i>To the Tangent of</i> <i>36 d. 52 m.</i>	9.8750613
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Which is the Angle at B, the Complement whereof being *53 d. 8 m.* is the Angle at C. Then for the side BC.

Plate

Of Oblique Triangles.

Plate I. Triang. III.

As the Sine of the Angle B 36 d. 52^m.

9.7781186

To its opposite side AC 210

2.3222193

So the Radius, or Sine of 90 d.

10.0000000

Sum

12.3222193

To its opposite side BC 350

2.5441007

(II.) Of Oblique Triangles.

Case I. Plate I. Triang. I.

Two Angles of an Oblique Triangle being given, and a side opposed to either of them, to find the other sides.

Example. In the Triangle ABC, the Angle at A is 36 d. the Angle at B is 45 d. and the side BC is 290. To find the rest of the parts of this Triangle. The Angle C is the Complement of the other two Angles to 180; for the three Angles always make 180 d. as in the third Rule: So that these two Angles A, being 30 d. and B 45 d. being added together, make 75 d. and their Complement to 180. being 105 d. is the Angle at C.

The Angles being all thus known, the sides unknown may be found as follows. To find the side AC,

As the Sine of the Angle A 30 d.

9.6989700

To the side opposed to it CB 290.

2.4623980

To the Sine of the Angle B 45 d.

9.8494850

Sum of the second and third

12.3118830

To the opposite side AC 410

- 2.6129130

In such cases as these, when you have a Sine or Tangent, in the first place you may work by the Arithmetical Complement thereof, and so save the Subtraction, as shall be shewn in the use of the Logarithms preceding the Table of Logarithms.

Thirdly,

Of Oblique Angles.

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Thirdly, Then to find the other side AB , by the opposite Angle at C , which is 105° . Here because the Angle exceeds 90° , you must take the Complement to 180° , which is 75° .

As the Sine $A 30^{\circ}$ d. Arith. Compl.	0.3010300
To the side opposed $CB 290$	2.4623980
So the Sine of 75° d.	9.9849438
To the side opposed $AB 560$	12.7483718

Thus you have all the parts of the Triangle.

Case II. Plate I. Triang. II.

Two sides of an Oblique Triangle, and an Angle opposed to one of them, being given, to find the other Angles and a third side.

This is but the Converse of the former.

Example. In the Triangle ABC , let the sides given be $AC 410$, and $CB 290$, the Angle opposed at $A 30^{\circ}$ d. to find the Angle B .

As the side $CB 290$ Compl. Arith.	7.5376020
To the Sine of the opposed Angle $A 30^{\circ}$ d.	9.6989700
So the side $AC 410$	2.6127839
To the Sine of the opposite Angle B	19.8493559

Which is $44^{\circ} 59'$.

Now the Angle A being 30° d. and $B 44^{\circ} 59'$ m. which make $74^{\circ} 59'$ m. the Angle C must be $105^{\circ} 1'$ m. the Complement to 180° , and the side AB opposed thereto, may be found as in the first Case 560 .

Case III. Plate I. Triang. III.

Two sides of an Oblique Triangle, with the Angle contained between them, being given, to find the other Angles and side.

In the Triangle ACD let the side AC be 410 , and the side $AD 560$, and the Angle between them at $A 30^{\circ}$ d. and it is required to find the other two Angles, and the side CD .

To resolve this Oblique Triangle, it is a plain way to reduce it into two right-angled Triangles, by letting fall the perpendicular CB from the Angle C .

First,

First, In the right-angled Triangle *ABC*, you have the Hypotenusal *AC* 410, and the Angle at *A* 30 d. Therefore as in Case I.

As Sine *B* 90 d. to *AC* 410 | And as *AB* 355 to Tang. *ACB* 60 d.
So Sine *C* 60 d. to *AB* 355 | So *BD* 205 to Tang. *CB* 45 d.

The Angles *ACB* and *DCB* make the Angle *ACD* 105 d. and therefore the Angle at *D* is 45 d.

Another way to perform this more usual.

Take the Sum of the two sides, and { Side *AD* 560
difference of them, and work thus. { Side *AC* 410

Sum	970
Diff.	150

As the Sum 970 Arith. Compl.	7.0132283
To the Diff. of the two sides 150	2.1760913
So Tang. of half the Sum of the Ang. unk. 75 d.	10.5719475
To Tang. of the diff. of half Ang. 29 d. 59 m.	19.7612671

This added to half the Sum of the Angles unknown, shews the greater Angle to be 104 d. 59 m. and subtracted from it, shews the less Angle to be 45 d. 1 m.	d. m.
	75 0
	29 59
	104 59

And thus having all the Angles, you may find the unknown side *CD*, by Case I.

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Case IV. Plate I. Triang. IV.

Having the three sides of an Oblique Triangle, to find the Angles.

In the Triangle *ACD*, suppose the greater side *AD* be 560, the two lesser sides

{ <i>AC</i> 410
{ <i>CD</i> 290
The Sum of these two 700
The Difference of them 120

As

Of Oblique Triangles.

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As the greatest side 560 Comp. Arith.	7.2518220
To the Sum of the two lesser 700	2.8450080
So the Diff. of them 120	2.0791812
To a fourth Number 150	<u>12.1760112</u>

This 150 is *AE*, a part of the greatest side, which being subtracted from it, the Perpendicular will fall in the middle of the Remainder, and so part *ECD* in two right-angled Triangles.

Thus the greater side <i>AD</i> being	560
The part to be subtracted	<u>150</u>
There remains <i>ED</i>	410
The half whereof is <i>BD</i>	205

which is the place where the Perpendicular *CB* falls, and is the Base of the lesser Triangle *DBC*; and this subtracted from the greater side, leaves 355 for the Base of the greater Triangle *ABC*.

Now having these two Bases of these two Triangles, and their Hypotenuses 410, and 290 given before, you may by the second Case find all the Angles.

1. In the Triangle *ABC*.

As *AC*, 410, to Sine *B* 90 deg.

So *AB*, 355, to Sine *C* 60 deg.

The Complement whereof is the Angle *A* 30 deg.

2. Then in the Triangle *CBD*.

As *CD* 290, to Sine *B* 90 deg.

So *BD* 205, to Sine *C* 45 deg.

Whose Complement is the Angle at *D* 45 deg.

Thus in the first Triangle *ACD*, we have found the Angle at *A* to be 30 d. the Angle at *D* to be 45. and the two Angles at *C* to be 60 d. and 45 d. the Sum 105 d.

C H A P. III.

Containing the Doctrine of Spherical Triangles.

HERE likewise you may take a few general Rules for the better understanding these Triangles.

1. These Spherical Triangles consist of six parts, that is, three Sides and three Angles, any three of which being known, the rest may be found.

2. The three sides of a Spherical Triangle are Arches of three great Circles of a Sphere, and as the sides of plain Triangles are measured by a Scale of equal parts, so these are to be measured by an Arch of equal degrees of a great Circle.

3. A great Circle divides the Sphere or Globe into two equal parts; as the Equinoctial, the Ecliptick and the Meridians, &c.

4. The sum of the sides of a Spherical Triangle are less than two Semicircles.

5. The sum of the three Angles of a Spherical Triangle, are greater than two right Angles, but less than six.

6. A Spherical Triangle is either Rectangular or Oblique-angular.

7. The Sines of the Angles are proportional to the Sines of their opposite sides, and on the contrary, the Sines of the sides are proportional to their opposite Angles.

8. In right-angled Triangles the side opposite to the right Angle is called the Hypotenuse, the other two are called Legs.

Of Right-angled Spherical Triangles.

Case I. Plate II. Triang. I.

The Hypotenuse and one of the Oblique-angles being known, to find the Leg opposite to that Angle.

In the Right-angled Triangle *ABC*, *AC* is 30 deg. and the Angle at *A* 23 d. 30 m. It is required to find the Leg *BC* opposite to the Angle at *A*.

As

Of Right-angled Spherical Triangles. 15

<i>As the Radius or Sine of 90 d.</i>	10.00000000
<i>To the Sine of the Hypotenuse AC 30 d.</i>	9.6989700
<i>So the Sine of the opposite Angle A 23 d. 30 m.</i>	<u>9.6006997</u>
<i>To the Sine of the Leg BC 11 d. 30 m.</i>	19.2996697

Case II. Plate II. Triang. II.

The Hypotenuse and one of the Oblique Angles being known, to find the Leg adjacent to that Angle.

As the Radius to the Cosine of the angle known,
So the Tangent of the Hypotenuse to the Tangent of the Leg required.

<i>As the Radius or 90 d.</i>	10.00000000
<i>To the Cosine of A, Cos. 23, 30.</i>	9.9623978
<i>So the Tangent of AC, Tang. 30 deg.</i>	<u>9.7614394</u>
<i>To the Tangent of AB, 27 d. 54 m.</i>	19.7238372

Case III. Plate II. Triang. III.

The Hypotenuse and one of the Oblique Angles being known, to find their other Oblique Angle.

As the Radius to the Cosine of the Hypotenuse ;
So the Tangent of the angle given, to the Co-tangent of the angle required.

Case IV. Plate II. Triang. IV.

The two Legs being given to find the Hypotenuse.

As the Radius to the Cosine of one of the Legs ;
So the Cosine of the other Leg, to the Cosine of the Hypotenuse.

Case V. Plate II. Triang. V.

The two Legs being given to find either of the Oblique Angles.

As the Sine of the Leg next the angle required, is to the Radius ;
So is the Tangent of the opposite Leg, to the Tangent of the angle required.

Case

16 Of Right-angled Spherical Triangles.

Case VI. Plate II. Triang. VI.

*One of the Legs and the Oblique Angle next it being given,
to find out the Hypotenuse.*

As the Cosine of the angle given, is to the Radius,
So the Tangent of the Leg given, to the Tangent of the
Hypotenuse.

Case VII. Plate II. Triang. VII.

*One of the Legs and the Oblique Angle next it being known,
to find the other Leg.*

As the Radius to the Tangent of the angle given,
So the Sine of the Leg given, to the Tangent of the Leg
required.

Case VIII. Plate II. Triang. VIII.

*One of the Legs and the Oblique Angle next it being given,
to find the other Oblique Angle.*

As the Radius to the side of the angle given,
So the Cosine of the given Leg, to the Cosine of the angle
required.

Case IX. Plate II. Triang. IX.

*One of the Legs and the Angle opposed to it being known, to
find the Hypotenuse.*

As the Sine of the given angle, to the Sine of the given Leg,
So is Radius, to the Sine of the Hypotenuse required.

Case X. Plate II. Triang. X.

*One of the Legs and the Angle opposite thereto being given,
to find the other Leg.*

As the Radius to Tangent of the given Leg,
So is the Tangent Complement of the given angle, to the
Sine of the given Leg required.

Of Right-angled Spherical Triangles. 17

Case XI. Plate II. Triang. XI.

*One of the Legs and an Angle opposite thereto being given,
to find the other Oblique Angle.*

As Sine Complement of the given Leg is to the Radius ;
So is the Sine Complement of the given Angle, to the
Sine of the Angle required.

Case XII. Plate II. Triang. XII.

*The Hypotenuse and one of the Legs being given, to find the
Angle adjoining to the given Leg.*

As Radius to the Tangent Compl. of the Hypotenuse ;
So is Tangent of the given Leg, to the Sine Complement
of the Angle required.

Case XIII. Plate II. Triang. XIII.

*The Hypotenuse and one of the Legs given, to find the Angle
opposite to the given Leg.*

As the Sine of the Hypotenuse to Radius ;
So is the Sine of the given Leg, to the Sine of the Angle
required.

Case XIV. Plate II. Triang. XIV.

*The Hypotenuse and one of the Legs being given, to find the
other Leg.*

As Sine Complement of the given Leg is to Radius ;
So is the Sine Complement of the Hypotenuse, to the
Sine Complement of the Leg required.

Case XV. Plate II. Triang. XV.

The two Oblique Angles being given, to find the Hypotenuse.

As the Tangent of one of the Angles is to the Radius ;
So is the Co-tangent of the other Angle, to the Co-sine
of the Hypotenuse.

Case XVI. Plate II. Triang. XVI.

The two Oblique Angles being given, to find either of the Legs.

As the Sine of the Angle adjacent to the Leg required to
the Co-sine of the other Angle ;

So is Radius to the Co-sine of the Leg sought.

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Of Oblique Spherical Triangles.

Case I. Plate II. Triang. I.

Two Angles, and a side opposite to one of them, being given, to find the side opposed to the other.

As the Sine of the Angle opposed to the side known,
To the Sine of the given side ;
So is the Sine of the other Angle opposed,
To the Sine of the side required.

Example. In the Triangle *ADE* having the side *AD* 30 deg. the Angle at *A* 23 deg. 30 min. and the Angle at *E* 38 deg. 30 min. to find the side *DE*.

As *s.E* to *s.AD*; So *s.A* to *s.DE*, which will be 18 d. 41 m.

CASE II. Plate II. Triang. II.

Two sides and one Angle opposed to one of them being given, to find the other opposed Angle.

This is but the Converse to the last Case, and is as follows.

As the Sine of the side opposite to the given Angle,
To the Sine of the given Angle ;
So is the Sine of the other given side,
To the Sine of the Angle required.

Case III. Plate II. Triang III.

Two sides together less than a Semi-circle with the Angle comprehended given, to find the other Angles.

They may be found at two Operations by a Proportion, demonstrated in the Trigonometry of the Learned Mr. Oughtred.

As the Sine of half the Sum of the sides,
To the Co-tangent of half the contained Angle ;
So the Sine of half the difference of the sides,
To the Tangent of half the difference of the Angles.

Again,

Of Oblique Spherical Triangles. 19

Again,

As the Co-sine of half the Sum of the sides,
To the Co-tangent of half the contained Angle;
So the Co-sine of half the difference of the sides,
To the Tangent of half the Sum of the Angles.

Add the half difference to the half sum, and you have the greater Angle; but subtract it and there remains the lesser Angle.

Example. In the Triangle ADE, there is given,

DAE 37 d. 03 m. { ADE }
AE 69 47 { and } required.
AD 46 53 { AED }

The Operation.

AE 69 d. 47 m.

AD 46 53

Sum 116 40 half Sum 58 d. 20 m.

Differ. 22 54 half Diff. 11 27

DAE 37 3 half thereof is 18 d. 31 m.

Co. Ar.

As S. half Sum sides AE and AD 58 d. 20 m. Log. 0.0700109

To S. half Diff. sides 11 27 9.2977883

So is T. C half DAE 18 31 10.4750605

To Tan. half Diff. Ang. D and E 34 51 19.8428597

Co. Ar.

As S. C. half Sum sides AE and AD 58 d. 20 m. 0.2798601

To S. C. half Diff. sides 11 27 9.9912696

So is T. C. half DAE 18 31 10.4750605

To Tang. half Sum Angles D and E 79 49 10.7461902

half Sum Angles D and E 79 49

half Diff. 24 51

Sum 114 40 ADE } required
Rem. 44 58 AED }

C 2

Note.

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Note. If the Sum of the two containing sides exceed a Semi-circle, then subtract each side severally from 180° and proceed with those Complements as with the sides given in this Example foregoing, the Operation produces the Complement of the Angles sought to a Semi-circle.

Case IV. Plate II. Triang. IV.

Two Angles together less than a Semi-circle with the side between them, to find the other sides.

'Tis performed at two Operations.
As the Sine of the half Sum of the Angles,
To the Sine of half their Difference;
So is the Tangent of half the interjacent side,
To the Tangent of half the Difference of the other sides.

Again,
As the Co-sine of half Sum of the Angles,
To the Tangent of half the interjacent side;
So the Co-sine of half their Difference,
To the Tangent of the half Sum of the other sides.

If half the Difference of the sides be added to half the sum of the sides, it makes the greater side; but subtracted from it leaves the lesser.

Note. If the Sum of the given Angles exceed a Semi-circle, subtract each Angle from a Semi-circle, and proceed with the Residues; the Operation will produce each sides Complement to 180° .

Case V. Plate II. Triang. V.

Two sides with an Angle opposite to one of them being given, to find the third side; the kind of the Angle opposite to the other side being foreknown.

Example. In the Triangle ADE there is given AD 46° d. 53° m. DE 38° d. 28° m. AED 45° d. to find the side AE.

First, Find the Angle opposite to the other side by the second Case, and then you have two sides and their opposite

Of Oblique Spherical Triangles. 21

site Angles. Find the third side by the following Proportion.

As the Sine of half the Difference of the Angles given,
To Tangent of half the Difference of the sides given;
So the Sine of half the Sum of those Angles,
To the Tangent of half the side required

The Operation.

As Sine AD	45d.	53m.		Co. Ar.	
To Sine AED	45	00		Log.	0.1366989
So is Sine DE	38	28			9.8494850
					<hr/> 9.7938317
To Sine DAE	37	03			19.7800156
	ADE	45	00		
	DAE	37	03		
	Sum	82	03	half Sum	41d. 01m.
	Diff.	07	57	half Diff.	03 58
		AD	46		53
		DE	38		28
		Diff.	08	25	half Diff. 4d. 12m.

As Sine half Diff. Angles A and E	03d.	58m.	Co. Ar.	
To Sine half Sum Angles	41	01	L.	1.1600439
So Tang. half Diff. sides AD and DE	04	12		9.8170882
				<hr/> 8.8659055
To Tang. half AE required	34	52		19.8430376
	34d.	52m.		
	34	52		

Doubled 69 44 AE required.

Case VI. Plate II. Triang. VI.

Two sides with an Angle opposite to one of them being given, to find the Angle included, or between them, the Species of the Angle opposite to the other side being foreknown.

First, find the Angle opposite to the other side by the second Case, and then we have two Angles and their opposite

22 Of Oblique Spherical Triangles.

posite sides, to find the other Angle by the Proportion following.

As the Sine of half the difference of the sides,
 To the Tangent of half the difference of the Angles ;
 So is the Sine of half the Sum of the sides,
 To the Co-tangent of half the Angle required ; that is,
 to the Tangent of an Ark, whose Complement is half the
 Angle required.

Case VII. Plate II. Triang. VII.

Two Angles with a side opposite to one of them being given, to find the third Angle, the kind of the side opposite to the other Angle being foreknown.

First, find the side opposite to the other Angle by the first Case, and then we have two Angles and their opposite sides, to find the third Angle, by the following Proportion.

As the Co-sine of half the difference of the sides,
 To the Tangent of half the Sum of the Angles ;
 So the Co-sine of half the Sum of the sides,
 To the Co-tangent of half the contained Angle.

Case VIII. Plate II. Triang. VIII.

Two Angles with a side opposite to one of them being given, to find the interjacent side, the kind of the side opposite to the other Angle being foreknown.

First, find the side opposite to the other Angle by the first Case, and then you have two sides, and their opposite Angles given, to find the third side by the Proportion following.

As the Co-sine of half the difference of the two Angles,
 To the Tangent of half the Sum of the two sides ;
 So the Co-sine of half the Sum of the two given Angles,
 To the Tangent of half the third side.

Case IX. Plate II. Triang. IX.

Two sides and their contained Angle being given, to find the third side.

Example. In the Triangle ADE there is given,

$$\begin{array}{rcl} \text{ADE } 137^{\circ} \text{ d. } 55^{\circ} \text{ m.} & & \\ \text{AD } 81 & 50 & \\ \text{DE } 38 & 28 & \end{array} \left. \vphantom{\begin{array}{rcl} \text{ADE } 137^{\circ} \text{ d. } 55^{\circ} \text{ m.} \\ \text{AD } 81 & 50 \\ \text{DE } 38 & 28 \end{array}} \right\} \text{AE required.}$$

The Resolution of this and the following Case is deduced from the Lord Napiers Catholick Proposition, (the Oblique Triangle, by a supposed Perpendicular, being reduced into two Rectangulars) by Mr. Collins in his Sector on a Quadrant The Operation.

As Radius		Log. 10.0000000
To Si. Co. ADE the contained Ang. 137d. 55m.		9.8262114
So is Tang. DE the lesser side	38 28	9.9000865
To Tang. of a fourth Arch	28 02	19.7262979

If the contained Angle be less than 90 deg. subtract the fourth from the greater side; but if it be greater than 90 d. from its Complement to 180 d. the Remainder is the Residual Arch.

		Com. Arith.
As S. C. of the fourth Arch	28d. 02m.	Log. 0.0541995
To S. C. of the Residual	70 08	9.5312649
So is S. C. of the lesser side DE	38 28	9.8937452
To S. C. the side required AE	107 32	19.4792096

Case X. Plate II. Triang. X.

Two Angles and the interjacent side being given, to find the third Angle.

Example. In the Triangle ADE there is given,

$$\begin{array}{rcl} \text{ADE } 114^{\circ} \text{ d. } 39^{\circ} \text{ m.} & & \\ \text{DAE } 37 & 03 & \\ \text{AD } 45 & 53 & \end{array} \left. \vphantom{\begin{array}{rcl} \text{ADE } 114^{\circ} \text{ d. } 39^{\circ} \text{ m.} \\ \text{DAE } 37 & 03 \\ \text{AD } 45 & 53 \end{array}} \right\} \text{AED required.}$$

C 4

The

The Operation.

As Radius

Log. 10.00000

To S. C. AD the interjacent side 46d. 53m. 9.8347297

So is Tang. DAE the lesser Angle 37 03 9.8779027

To Tang of the fourth Arch 27 17 19.7126324

If the interjacent side be more than a Quadrant, subtract the fourth Arch from the greater Angle, if less, from the said Angles Complement to 180 d. the Remainder is the residual Arch.

Com. Arith.

As S. C. of the fourth Arch 27d. 17m. Log. 0.0512201

To S. C. of the Residual Arch 38 04 9.8961369

So is S. C. DAE the lesser Angle 37 03 9.9020628

To S. C. AED the Angle required 45 01 19.8494198

In this and the foregoing Case the Affection of the required side or Angle, may be determined by the Residual Arch.

For if the contained Angle, or interjacent side, be less than a Quadrant, and the residual Arch more, or when the contained Angle, or interjacent side is greater than a Quadrant and the Residual Arch less, the side or Angle required is greater than 90 d. in all other Cases less.

Case XI. Plate II. Triang. XI.

Three sides given to find an Angle.

Example. In the Triangle ADE, there is given,

AE 110 d. 13 m.

AD 81 50

DE 38 28

ADE required.

For the Resolution of this Case take this Direction.

Add the three sides together, and from their half Sum subtract the side opposite to the Angle required.

Then to the Complements Arithmetical of the Logarithm Sines of the containing sides, add the Logarithm Sines of the half Sum and Remainder: Half the total of these four Logarithms is the Sine Complement of half the Angle required.

The

The Operation.

AD 81 d. 30 m.	} The contain- ing sides.	{ S. Co. Ar.	0.0044266
DE 38 28			0.2061683
AE 110 13			9.9563870
Sum 230 31	Rem. 05 02	S.	8.9431743
h. sum 115 15			Sum 19.1101562
Rem. 05 02	S. C. 68 38	half Sum	9.5550781

Which being doubled, produces ADE 137 deg. 56 min. required.

Case XII. Plate II. Triang. XII.

Three Angles given, to find a side.

Example. In the Triangle ADE there is given,

ADE 137 d. 55 m.	} DE required.
AED 45 00	
DAE 26 23	

This Case is likewise perform'd by the direction in the eleventh Case, the Angles being converted into sides, and the sides into Angles, by taking the Complement of the greatest Angle to a Semi-circle.

Com. ADE 42 d. 05 m.	} The Adjacent Angles.	{ S. Co. Ar.	0.1737886
AED 45 00			0.1505150
DAE 26 23			9.9222721
Sum 113 28	Rem. 30 21	S.	9.7035329
half Sum 56 44			Sum 19.9501086
Rem. 30 21	S. C. 19	half Sum	9.9750543

Which, being doubled, gives DE 38 deg. 30 min. required,

C H A P. IV.

Containing Problems of Sailing by the Plain Sea Chart, commonly called Plain-Sailing.

Navigation is commonly distinguished into three sorts, Plain Sailing, *Mercator's Sailing*, and Circular Sailing, of Sailing by the Arch of a great Circle.

Plain Sailing, or Sailing by the Plain Chart, is the plainest, and the Foundation of all the rest, and near the Equinoctial there is need of no other to be used, because there the Degrees of Longitude, as well as the Degrees of Latitude, are all equal; each Degree being divided into 60 Minutes or Miles, though they are somewhat more than English Miles, each Minute or Mile containing about 6000 Feet.

In this Art the Sea-man hath these helps.

First, He hath his Compass to direct him which way he Sails; which is divided first into four Cardinal Points or Quarters, East, West, North, South, and each of these Quarters are divided into eight equal Parts, commonly called Rumbs, making in all 32 Points. So that steering by the Compass, well made and duly rectified, the Sea-man always knows which way he Sails, to a small matter.

The second Help the Sea-man hath in keeping his Account is a careful Observation (by the Log-line or some other good way) how many Miles or Leagues he Sails every Hour, and so every Watch, and every Day.

The third Help, is the Knowledge and Observation of the Latitude, both of the place from whence he Sails, and where he is arrived, or whither he is to Sail.

And out of these three things, by the Doctrine of plain Triangles, he comes to know all that is necessary for the keeping of his Account; so that he may know at any time where he is, how far he hath sailed, and how far he is yet to sail, and which way, or upon what Point of the Compass he

he is to steer, and all this by these few Rules of Rectangular Triangles.

PROB. I. Plate I. Triang. I.

The Course and Distance given, to find the Difference of Latitude, and the Departure.

Example. A Ship sailing N. E. by N. 372 Minutes, I demand her Difference, Latitude and Departure.

In the Triangle ABC,

AC represents the distance sailed,

AB the diff. Latitude.

BC the departure.

BAC the Angle of the Course from the Meridian,

ACB the Complement of the Course.

The Operation.

For the difference of Latitude. Plate I. Triang. I.

As Radius	Log. 10.0000000
To the distance sailed 372 m.	2.5705429
So is Sine Compl. of the Course 56 d. 15 m.	9.9198464
To the diff. Latitude 309 min.	12.4903893

For the Departure.

As Radius	Log. 10.0000000
To the Distance sailed 372 min.	2.5705429
So is S. Course 33 d. 45 min.	9.7447390
To the Departure 206 m.	12.3152819

PROB. II. Plate I. Triang. II.

The Course and Difference of Latitude being given, to find the Distance and the Departure.

Example. A Ship sailing N. W. by N. until her difference of Latitude be 309 Minutes, I demand her Distance and Departure.

The

Of Plain Sailing.

The Operation.
For the Distance.

As S. C. of the Course, 56 d. 15 m.	Log. 9.9198464
To the differ. Latitude 309 m.	2.4899585
So is Radius	10.0000000
To the Distance sailed 371 m.	2.5701121

For the Departure. Plate I. Triang. II.

	Co. Ar.
As Sine Compl. of the Course 56 d. 15 m.	Log. c.0801536
To the Diff. Latitude 309 min.	2.4899585
So is Sine Course 33 d. 45 min.	9.7447390
To the Departure 206 min.	2.3148511

P R O B. III. Plate I. Triang. III.

The Course and Departure given, to find the Distance and Difference of Latitude.

Example. A Ship sailing South East by South, until her Departure be 206 Minutes, I demand the Distance and Difference of Latitude.

The Operation.
For the Distance.

As S. Course	33 d. 45 m.	Log. 9.7447390
To the Departure	206 m.	2.3138672
So is Radius		10.0000000
To the Distance	370 m.	2.5691282

For the Difference of Latitude. Plate I. Triang. III.

		Co. Ar.
As S. Course	33 d. 45 m.	Log. 0.2552610
To the Departure	206	2.3138672
So S. C. Course	56 15	9.9198464
To Diff. Latit.	309	2.4889746

P R O B.

PROB. IV. Plate I. Triang. IV.

The Difference of Latitude and Distance given, to find the Course and Departure.

Example. A Ship sails between the North and the East 372 min. until her Difference of Latitude be 309 min. I demand her Course and Departure.

The Operation

For the Course.

As the Distance sailed 372 min.	Log. 2.5705429
To Radius	10.0000000
So is the Diff. Lat. 309 m.	2.4899585
To the S. C. Course 33 d. 50 m.	9.9194156

For the Departure.

As Radius	Log. 10.0000000
To the Distance 372 min.	2.5705429
So is the Sine Course 33 d. 50 m.	9.7456828
To the Departure 207 m.	12.3162257

PROB. V. Plate I. Triang. V.

The Distance and Departure given, to find the Course and Difference of Latitude.

Example. A Ship sails between the South and the West 372 min. until her Departure be 206 min. I demand the Course and Difference of Latitude.

The Operation.

For the Course. Plate I. Triang. V.

As the Distance 372 min.	Log. 2.5705429
To Radius	10.0000000
So is the Departure 206 min.	2.3138672
To the Sine Course 33 d. 37 m.	9.7433243

For

Of Plain Sailing.

For the Difference of Latitude.

<i>As Radius</i>	<i>Log.</i> 10.0000000
<i>To the Distance</i> 372 min.	2.5705429
<i>So is S. C. Course</i> 56 d. 23 m.	9.9205200
<i>To the Diff. Latitude</i> 309 min.	12.4910629

PROB. VI. Plate I. Triang. VI.

The Difference, Latitude and Departure given, to find the Course and Distance.

Example. A Ship sailing between the South and the West, until her Difference of Latitude be 309 min. and her Departure 206 min. I demand the Course and Distance.

The Operation.

For the Course.

<i>As the Diff. Lat.</i> 309 min.	<i>Log.</i> 2.4899585
<i>To Radius</i>	10.0000000
<i>So is Departure</i> 206 min.	2.3138672
<i>To T. Course</i> 33 d. 41 m.	9.8239297

For the Distance. Plate I. Triang. VI.

<i>As S. Course</i> 33 d. 41 m.	<i>Log.</i> 9.7439817
<i>To the Departure</i> 206	2.3138672
<i>So is Radius</i>	10.0000000
<i>To the Distance</i> 371	2.5698853

CHAP. V.

*Containing Problems of Sailing by Mercators Chart,
commonly called Mercators Sailing.*

HERE it will be necessary to have a Table of Meridional Parts, which I have taken out of Mr. *Wright's* Tables, to every tenth Minute of Latitude, accounting it in Miles or Minutes of the Equinoctial, the better to avoid Fractions, as he and Mr. *Norwood* have designed it, which is inserted towards the end of this Book.

PROB. I.

To find the Meridional Difference of Latitude, or the Difference of Latitude in Meridional Parts.

First, If one place be under the Equinoctial and the other in North or South Latitude, the Meridional Parts (in the Table of Meridional Parts) answering to the Degrees and Minutes of the place having Latitude, is the Meridional Diff. Latitude.

Example. One place in the Latitude 37 deg. 27 min. North, the other under the Equinoctial, I demand the Different Latitude in Meridional parts.

Lat. 37 d. 27 m. ————— 2426
2426 is Meridional Diff. Latitude.

Secondly, If two places be both in North, or both in South Latitude, subtract the Meridional parts of the less Latitude from those of the greater, the Remainder is the Meridian Diff. Latitude.

Example 1.

	<i>M. Parts.</i>
One place in the Latitude 37 d. 20 m. North	2417
The other in the Latitude 17 10 North	1045
The Meridional Diff. Latitude	1372
	<i>Example</i>

Example 2.

	<i>M. Parts.</i>
One place in the Latitude 45 d. 56 m. South	3109
The other in the Latitude 29 17 South	1838
The Meridional Diff. Latitude	1271

Thirdly, If of the two places the one have North Latitude, the other South, add the Meridional parts of each Latitude together, the Sum is the Diff. Latitude in Meridional parts.

Example.

	<i>M. Parts.</i>
One place in the Latitude 42 d. 17 m. South	2804
The other in the Latitude 27 19 North	1704
The Meridional Diff. Latitude	4508

PROB. II. Plate I. Triang. I.

Both Latitudes and the Difference of Longitude between any two places being given, to find the Course and Distance.

Admit A the Lizard in the Latitude 50 deg. North, and C the Barbadoes in the Latitude 13 deg. 12 min. North, the Difference of Longitude 54 d. 57 m. West. I demand the Course and Distance.

In the Triangle Abc,

Ab represents the proper Difference of Latitude.

bc the Departure.

Ac the Distance sailed.

bAc the Course.

Acb the Complement of the Course.

In the Triangle ABC,

AB represents the Meridional Difference of Latitude.

BC the Difference of Longitude.

BAC the Angle of the Course.

ACB the Complement of the Course.

This being understood, the Proportions are the same as in the Doctrine of plain Right-angled Triangles.

The Difference of Longitude reduced to Minutes makes
3297 min. To

To find the Meridional Difference of Latitude.

	<i>M. Parts.</i>
One place in the Latitude 50 d. 00 m. North	3474
The other in the Latitude 13 12 North	<u>0799</u>
The Meridional Diff. Latitude	2675

The Operation.

For the Course.

As Merid. the Diff. Lat. 2675 min.	Log. 3.4278238
To Radius	<u>10.0000000</u>
So is the Diff. of Longitude 3297 m.	<u>3.5181189</u>
To T. Course 50 d. 57 m.	10.0907951

The Course is South-West, half West.

For the Distance.

Lat. 50 d. 00 m.	
Lat. 13 12	
Proper Diff. Lat. 36 48 which is 2208 min.	
As S. C. of the Course 39 03	Log. 9.7993394
To Proper Diff. Latitude 2208 min.	<u>3.3439991</u>
So is Radius	<u>10.0000000</u>
To the Distance 3505 min.	3.5446597

P R O B. III. Plate I. Triang. II.

Both Latitudes and the Course given, to find the Distance and Difference of Longitude.

Example. A Ship sails from the Lizard, in the Latitude 50 deg. North, until she be in the Latitude 13 deg. 12 min. North; her Course South-West 50 deg. 57 min. or S.W. half W. somewhat Westerly, I demand the distance and difference of Longitude.

The proper Diff. Latitude is 2208 min.

The Meridional Diff. Lat. is 2675 min.

D

The

The Operation.

For the Distance. Plate I. Triang. II.

As Sine Compl. of the Course 39 d. 3 m. Log. 9.7993394

To the Differ. Latit. 2208 min. 3.3439991

So is Radius 10.0000000

To the Distance 3505 min. 3.5446597

For the Difference of Longitude. Plate I. Triang. II.

As Radius Log. 10.0000000

To Meridional Diff. Lat. 2675 m. 3.4273238

So is T. Course 50 d. 57 m. 10.0908560

To the Difference of Longitude 3297 m. 13.5181798

P R O B. IV. Plate I. Triang. III.

Both Latitudes and the Distance given, to find the Course and Difference of Longitude.

Example. A Ship sails from the Latitude 40 deg. North
 3505 min. until she be in the Latitude 13 d. 12 m. North;
 I demand the Course and Difference of Longitude.

The Meridional Difference of Latitude is 2675 min.

The proper Difference of Latitude is 2208 min.

The Operation.

For the Course. Plate I. Triang. III.

As the Distance 3505 min. Log. 3.5446880

To Radius 10.0000000

So is the Difference of Latitude 2208 min. 3.3439991

To Sine Comp. Course 39 d. 3 m. 9.7993111

For the Difference of Longitude. Plate I. Triang. III.

As Radius Log. 10.0000000

To the Merid. Diff. Lat. 2675 min. 3.4273238

So is T. Course 50 d. 57 m. 10.0908560

To the Difference of Longitude 3297 m. 13.5181798

P R O B.

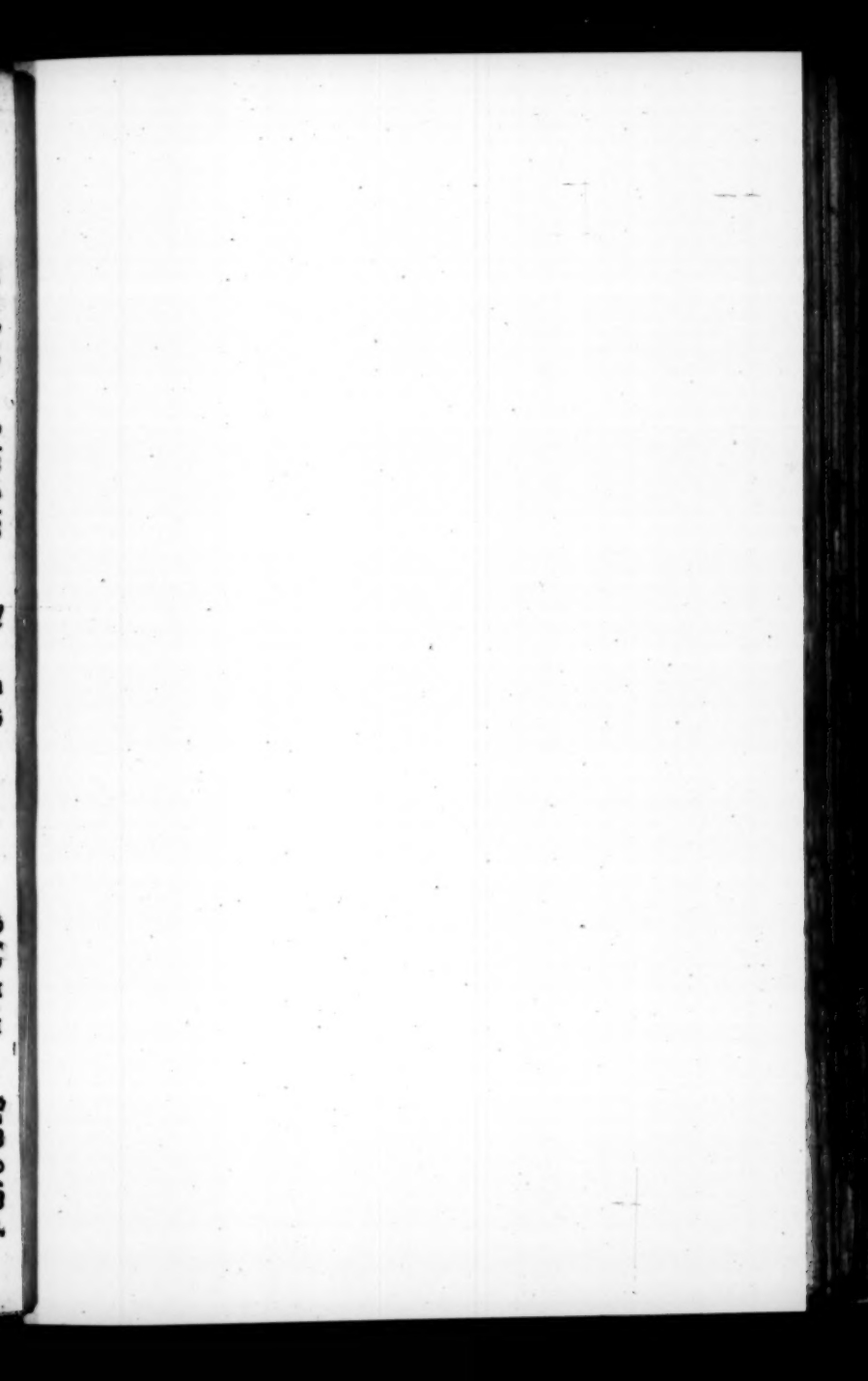
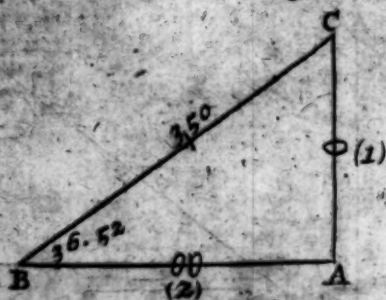
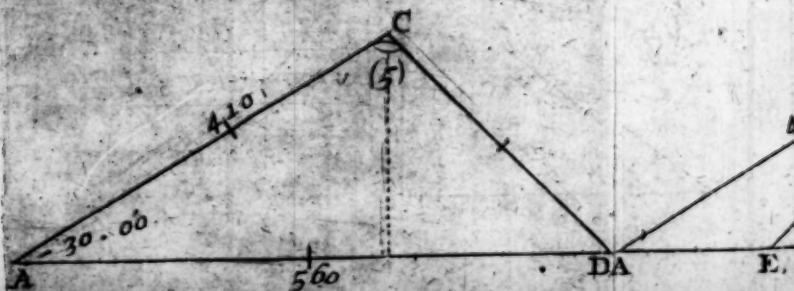
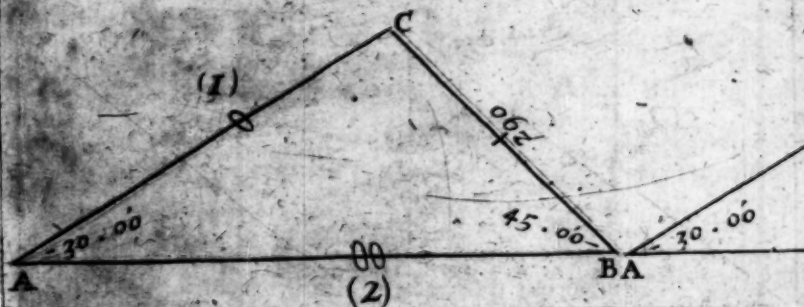


Plate I.

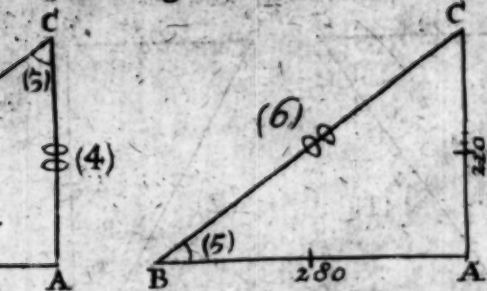
Right Angled Plain T



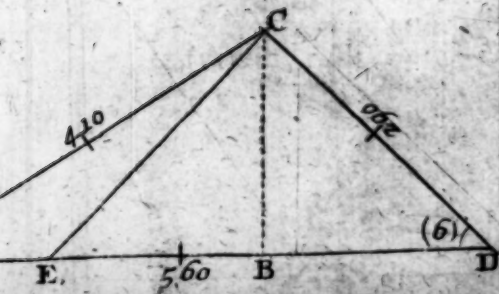
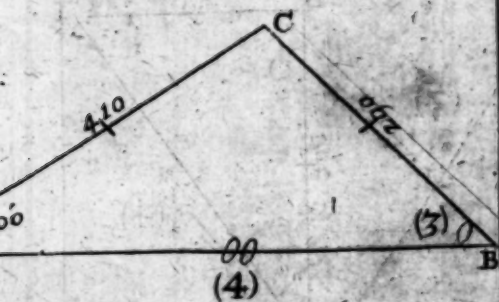
Oblique Plain Tri



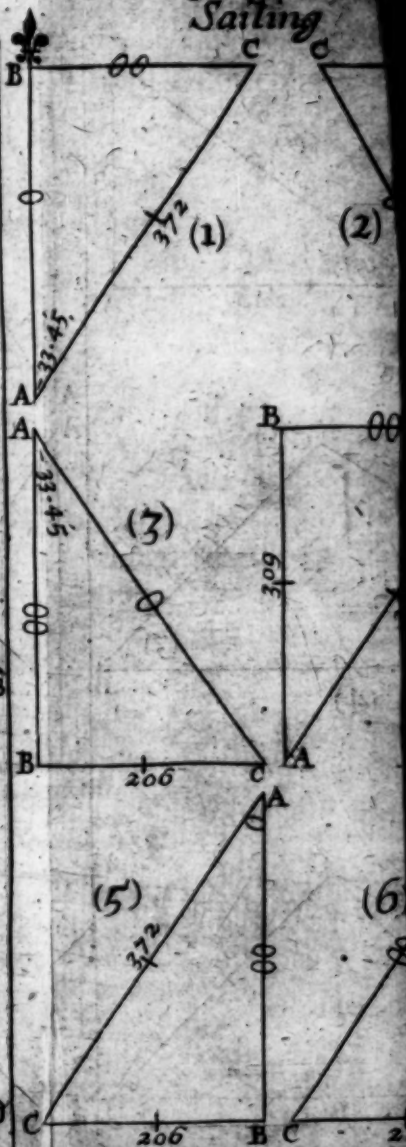
Triangles



Triangles

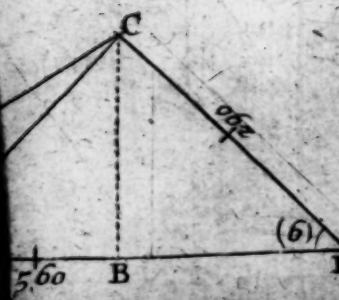
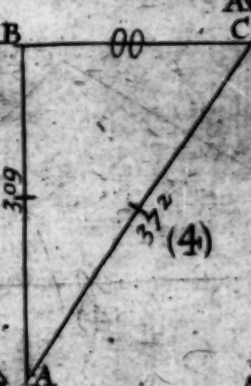
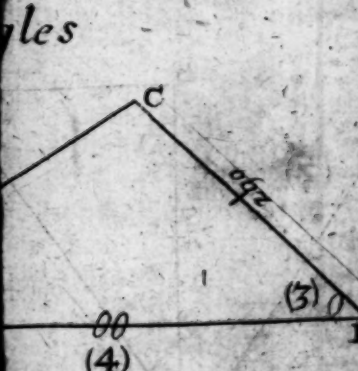
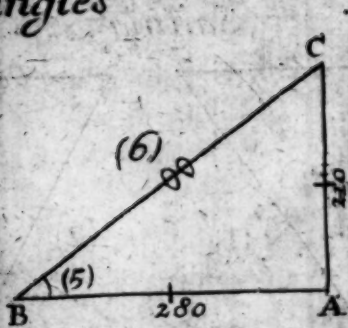


Triangles for Sailing

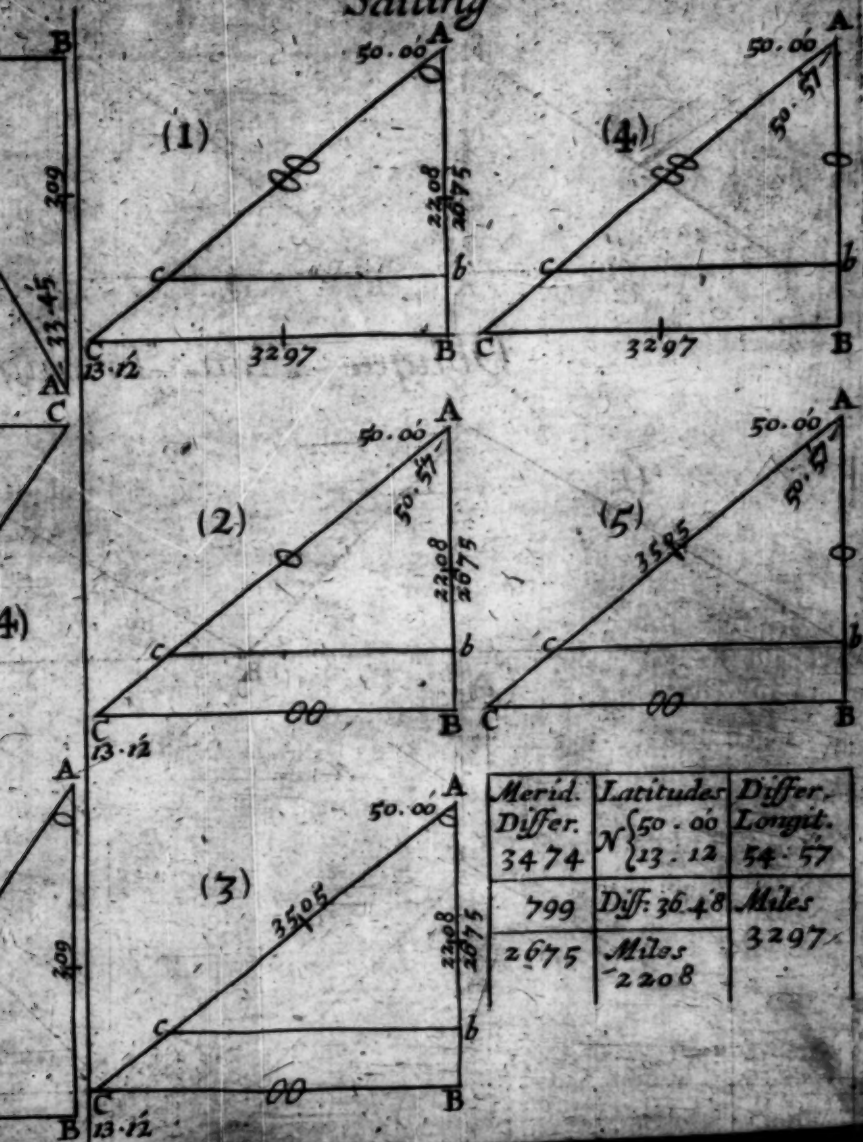


angles

Triangles for Plain Sailing



Triangles for Mercators Sailing



PROB. V. Plate I. Triang. IV.

One Latitude, the Course and Difference of Longitude being given, to find the other Latitude and the Distance.

Example. A Ship sails S. W. 50 deg. 57 min. or S. W. half W. somewhat more Westerly from the Latitude 50 d. North, until the Difference of Longitude be 3297 min. I demand the other Latitude and Distance.

The Operation.

For the other Latitude:

<i>As T. Course</i> 50 deg. 57 min.	<i>Log.</i> 10.0908560
<i>To Difference of Longitude</i> 3297 min.	3.5181189
<i>So is Radius</i>	10.0000000
<i>To the Merid. Diff. Lat.</i> 2675 min.	3.4272629
	<i>M. Parts.</i>
<i>The Meridional parts answering to Lat. 50 d. N. are</i>	3474
<i>From which subtract</i>	2675
<i>There remains</i>	799

Against which in the Table of Merid. parts is Lat. 13 d. 12 m. which is the Latitude of the place North.

For the Distance. Plate I. Triang. IV.

The proper Difference of Latitude is 2208 min.

<i>As Sine Comp. Course</i> 39 d. 3 m.	<i>Log.</i> 9.7993394
<i>To the Diff. of Latitude</i> 2208 min.	3.3439991
<i>So is Radius</i>	10.0000000
<i>To the Distance</i> 3505 min.	3.5446597

PROB. VI. Plate I. Triang. V.

One Latitude, the Course and Distance given, to find the other Latitude and difference of Longitude:

Example. A Ship being in the Latitude 50 d. North, sails S. W. 50 d. 57 m. or S. W. half W. and somewhat Westerly 3505 m. I demand the other Latitude and Difference of Longitude.

The Operation.

For the Difference of Latitude. Plate I. Triang. V.

<i>As Radius</i>	<i>Log.</i> 10.0000000
<i>To the Distance</i> 3505 min.	3.5446880
<i>So is S. C. Course</i> 39 d. 3 m.	9.7993394
<i>To the proper Difference of Latitude</i> 2208 min.	3.3440274
The other Latitude is 13 deg. 12 min. North.	
The Meridional Diff. Lat. is 2675 min.	

For the Difference of Longitude. Plate I. Triang. V.

<i>As Radius</i>	<i>Log.</i> 10.0000000
<i>To the Merid. Diff. Lat.</i> 2675 min.	3.4273238
<i>So is T. Course</i> 50 d. 57 m.	10.0908560
<i>To the Diff. of Longitude</i> 3297 min.	23.5181798

P R O B. VII.

Two Places, both in one Parallel or Latitude, and their Difference of Longitude being given, to find the Distance between them.

Example. Suppose two places, both in the Parallel or Latitude of 50 deg. and their Difference of Longitude 70 deg. I demand the Distance between them.

The Operation.

The Difference of Longitude in Minutes is 4200.

<i>As Radius</i>	<i>Log.</i> 10.0000000
<i>To Diff. Longitude</i> 4200 min.	3.6232493
<i>So is S. C. Latitude</i> 40 d.	9.8080675
<i>To the Distance</i> 2700 min.	3.4313168

P R O B. VIII.

Two places both in one Latitude, and their Distance given, to find their Difference of Longitude.

Example. Suppose two places, both in the Latitude 50 d. and the Distance between 2700 m. I demand the Difference of Longitude.

The

Of Mercators Sailing.

37

The Operation.

As S. C. Latitude 40 deg.	Log. 9.8080675
To the Distance 2700 min.	3.4313638
So is Radius	10.0000000
To Diff. Long. 4200 min.	3.6232963

P R O B. IX.

Two Places situate both in one Parallel or Latitude, their Distance and Difference of Longitude being given, to find the Parallel of Latitude.

Example. A Ship sailing due West, 2700 min. altereth her Diff. Longitude 4200 min. I demand what Latitude the Ship sails in.

The Operation.

As Diff. Longitude 4200 min.	Log. 3.6232493
To Radius	10.0000000
So is the Distance 2700 min.	3.4313638
To S. C. Latitude 40 d.	9.8081145
Whose Compl. is 50 d. the Latitude sought.	

C H A P. VI.

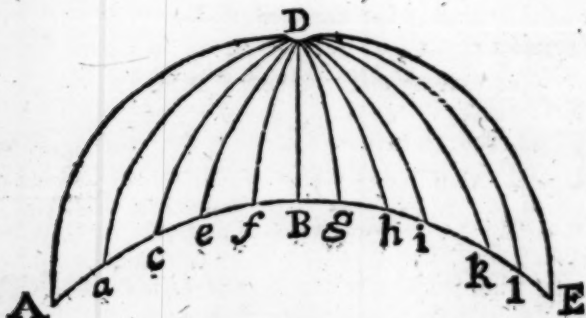
Shewing to Sail by the Arch of a Great Circle, commonly called Great Circle Sailing.

THis, though in some sense it is the most exact way of Sailing, shewing the nearest way and distance between any two places, yet it is very difficult, and not so much used as the two former kinds of Sailing; for Sea-men do seldom keep their Course near this Arch, but are either drawn aside from it by some conveniences of Winds and Streams, as in Sailing to the *West-Indies*, they hale away more to the Southward; or else they are forced from this Course by cross Winds, or Interposition of some Head-lands or Islands. So that their best way is to keep their

Account by the former Rules. Only having Skill herein, they may see that it is many times the nearer way to leave the Rumb, and to Sail more Northerly, as in Sailing home from the *West-Indies*; which makes those that keep not a true Account by the former Rules, but reckon altogether by the plain Chart, to be at the *Lands-end* many Leagues before their Account. Also in a parallel Course, as from the *Lands-end* to *New-found-land*, you may see how you may advantage your selves by raising and depressing the Pole 10 or 12 *d.* which will be a great help for the keeping your Account, and yet go a nearer way than if you should sail in the parallel East and West.

Example. A Ship being in the Latitude 50 *d.* North, is bound to a Port in the same Parallel, whose Difference of Longitude Westerly is 47 *d.* I demand the Angles of Position, the Distance in the Arch of a great Circle by what Latitudes and Longitudes the Arch shall pass, likewise the Course and Distance from place to place according to *Mercator*.

Let A represent the first place, E the second. ABE is the Arch of a great Circle passing over both places. D the North Pole, DA the Meridian of A, and DE the Meridian of E. The Angle ADE is 47.00. Latitude of A and E 50.00 North.



The Operation.

To find the Angles of Position BAD and BED.

The Oblique-angled Triangle ADE is reduced into two equal

equal Right-angled Triangles ABD and EBD, the Sides and Angles being equal; therefore in either of them there is given the Hypotenuse, and the Angle at D, to find the Angle at A or E.

In the Triangle ABD.

As T. C. ADB,	23 d. 30 m.	Log. 10.2616981
To Radius		10.0000000
So is S. C. AD	40 90	9.8842540
To T. C. BAD	71 35	9.5225559

2. To find the Distance AE.

In the Triangle ABD.

As Radius		Log. 10.0000000
To S. DA	40 d. 00 m.	9.8080675
So is S. ADB	23 30	9.5006997
To S. AB	14 51	9.4087672
AB	14 51 being doubled produces	
AE	29 42 or 1782 min.	

3. To find the Latitudes by which the Arch shall pass at every five Degrees of Longitude from A, representing the first Port.

First, You must find the greatest Latitude by which the Arch passes.

In the Triangle ABD.

As T. C. AD.	40 d. 00 m.	Log. 10.0761865
To Radius		10.0000000
So is S. C. ADB	23 30	9.9823978
To T. BD	37 35	9.8862113

The Complement of BD (to 90 d) 52 d. 25 m. is the greatest Latitude.

Secondly, To find the Latitude by which the Arch passes at every five degrees of Longitude from A, you must resolve the several Right-angled Triangles BDa, BDc, BDe, &c.

Of Great Circle Sailing.

Subtracting five deg. from ADB	23 d.	30 m.
There remains	aDB	18 30
Subtracting five deg. from	18	30
Remains	BDe	13 30

And so for the rest as follows in the Table.

	d.	m.	
a D B	18	30	In the Triangle aBD. To find by what Latitude the Point (a) passes.
B D c	13	30	
B D e	08	30	
B D f	03	30	
B D g	01	30	
B D h	06	30	As Radius
B D i	11	30	
B D k	16	30	
B D l	21	30	
			Log. 10.0000000
			To T. C. BD 37d. 35m. 10.1137122
			So is S. C. aDB 18 30 9.9769566
			To T. C. Da 39 04 10.0906688

The Complement of Da 50d. 56m. North is the Latitude of the Point (a)

After the same manner are found the Latitudes for the Points c, e, &c. in the subsequent Table.

Long.	Lat.	
d. m.	d. m.	
A 00 00	50 00	Fourthly, Having the Latitudes and Longitudes, by which the Arch passes, you may find the Course and Distance from place to place by Mercator.
a 05 00	50 56	
c 10 00	51 38	
e 15 00	52 06	
f 20 00	52 22	
g 25 00	52 24	So to find the Course and Distance Aa, there is given both Latitudes 50 d. North, and 50 deg. 56 min. North.
h 30 00	52 14	
i 35 00	51 51	
k 40 00	51 14	
l 45 00	50 24	
E 47 00	50 00	And the Difference of Longitude five deg. West.

The

The Meridional Difference of Latitude is 87 min.

For the Course.

As Merid. Diff. Lat. 87 min.	Log. 1.9395192
To Radius	10.000000
So is the Diff. of Long. 300 m.	2.4771212
To T. Course 73 d. 49 m.	10.5376020

For the Distance.

As S. C. 16 d. 11 m.	Log. 9.4451333
To the Difference of Latitude 56 m.	1.7481880
So is Radius	10.0000000
To the Distance 200 m.	2.3030327

After the same manner you will find the Courses and Distances ac, ce, &c. as they follow in the Table.

Places.	Courses.	Distance.
from A to a	N W 73d. 49m.	200
from a to c	N W 77 13	189
from c to e	N W 81 28	188
from e to f.	N W 85 02	184
from f to g	N W 89 22	180
from g to h	S W 86 45	176
from h to i	S W 82 58	187
from i to k	S W 78 41	188
from k to l	S W 75 14	198
from l to E	S W 72 51	81

But

But in regard most of the Courses afore found are so near the West, you may sail W. N. W. 917 min. until you are in Latitude 55 d. 51 min. North, and then W. S. W. 917 min. farther you will arrive at your Port. By this means you will alter your Latitude almost six Degrees, which is considerable, in respect of the benefit of Observation; besides the Distance is but 52 min. more than that of a great Circle, and not above 22 min. more than the Parallel, or West Distance.

C H A P. -VII,

Containing many Astronomical Problems very useful in the Art of Navigation: Illustrated by the general Scheme annexed p. 45.

Astronomical Definitions.

THE Poles of the World are two fixed Points in the Heavens, diametrically opposite to one another, the one visible in our Hemisphere, called the North or Arctick Pole, noted with the Letter *P*; the other not seen of us, being in the lower Hemisphere, called the South or Antartick Pole, noted with *S*.

The Axis of the World is an imaginary Line drawn from Pole to Pole, about which the Diurnal Motion is performed from East to West.

The Meridians are great Circles concurring and intersecting one another in the Poles of the World, as *PES* and *PeS*.

The Equinoctial or Equator, is a great Circle, 90 deg. distant from the Poles of the World, cutting the Meridians at Right Angles, and dividing the World into two parts, called the North and South Hemispheres; as *E* \simeq *Q*.

The Ecliptick is a great Circle crossing the Equinoctial in the two opposite Points *Aries* and *Libra*, and making an Angle therewith (called its Obliquity) of 23 deg. 30 min.

This

This Circle is divided into 12 Signs, each containing 30 d. whose Names and Characters follow.

Aries	♈	} Which are called Northern Signs.	Libra	♎	} These are called Southern Signs.
Taurus	♉		Scorpio	♏	
Gemini	♊		Sagittarius	♐	
Cancer	♋		Capricornus	♑	
Leo	♌		Aquarius	♒	
Virgo	♍		Pisces	♓	

The Ecliptick is represented by ☊ ☋ ☌.

The Zodiack is a Zone having eight Degrees of Latitude on either side of the Ecliptick, in which space the Planets make their Revolutions. It is divided and distinguished by the twelve Signs.

The Colures are two Meridians dividing the Equinoctial and the Ecliptick into four equal parts, one of these passes by the Equinoctial Points, *Aries* and *Libra*, and is called the Equinoctial Colure, as P ☋ S: the other by the beginning of *Cancer* and *Capricorn*, called the Solstitial Colure, P ☊ S ☌.

The Poles of the Ecliptick are two Points 23 deg. 30 min. distant from the Poles of the World; as I and K.

The Tropicks are two small Circles parallel to the Equinoctial, and distant therefrom 23 d. 30 m. limiting the Sun's greatest Declination.

The Northern Tropick passes by the beginning of *Cancer*, and is called the Tropick of *Cancer*; as ☊ aD.

The Southern Tropick passes by the beginning of *Capricorn*, and is called the Tropick of *Capricorn*; as Ab ☌.

The Polar Circles are two small Circles parallel to the Equinoctial, and distant therefrom 66 d. 30 m. and from the Poles of the World 23 d. 30 m.

That which is adjacent to the North Pole is called the Artick Circle, GdI; and the other the Antartick Circle, as KdM.

The Zenith and Nadir are two Points diametrically opposite: The Zenith is the Vertical Point, or the Point right over

over our Heads, as Z; the Nadir is directly opposite there to, as N.

The Azimuths, or Vertical Circles, are great Circles of the Sphere, concurring and intersecting each other in the Zenith and Nadir, as Z f N.

The Horizon is a great Circle 90 *deg.* distant from the Zenith and Nadir, cutting all Azimuths at Right Angles, and dividing the World into two equal parts, the upper and visible Hemisphere, and the lower and invisible; This Circle is represented by H a R.

The Meridian of a place is that Meridian which passes by the Zenith and Nadir of the place; as PZSN.

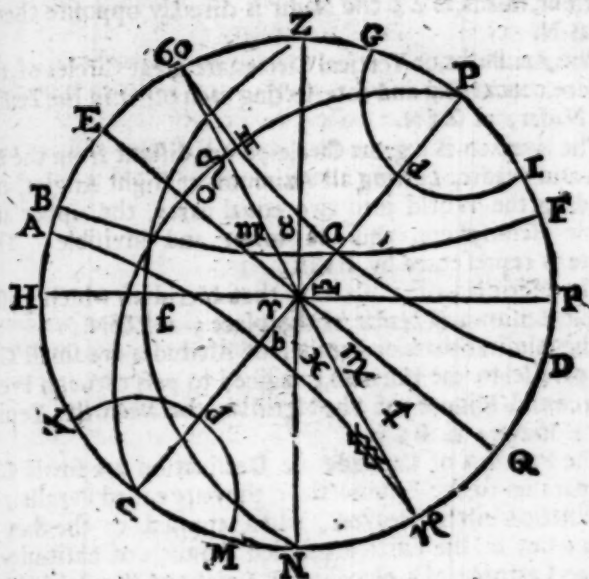
The Almicanthars, or Parallels of Altitudes are small Circles parallel to the Horizon, imagined to pass through every Degree and Minute of the Meridian, between the Zenith and Horizon; as B a F.

The Parallels of Latitude or Declination are small Circles parallel to the Equinoctial: they are called Parallels of Declination in the Heavens, when applied to the Sun or Stars; but on the Earth are called Parallels of Latitude.

The Latitude of a place is the Height of the Pole above the Horizon, or the Distance between the Zenith and the Equinoctial.

The Latitude of a Star is the Arch of a Circle contained between the Centre of a Star and the Ecliptick Line, this Circle making Right Angles with the Ecliptick, and is counted either Northward or Southward, according to the situation of the Star.

Longitude on the Earth is measured by an Arch of the Equinoctial, contained between the primary or first Meridian of that place where the Longitude is assigned to begin, and the Meridian of any other place, counted always Easterly.



The Longitude of a Star, is that part of the Ecliptick, which is contained between the Stars place in the Ecliptick, and the beginning of *Aries*, counting according to the succession of the Signs.

Altitude of the Sun or Stars is the Arch of an Azimuth, contained between the Centre of the Sun or Star and the Horizon.

Ascension is the rising of any Star, or any part of the Equinoctial above the Horizon, and Descension is the setting thereof.

Right Ascension is the number of Degrees and Minutes of the Equinoctial (counted from the beginning of *Aries*) which cometh to the Meridian with the Sun or Stars, or with any portion of the Ecliptick.

Oblique Ascension is an Arch of the Equinoctial between the beginning of *Aries* and that part of the Equinoctial that

rileth

riseth with the Centre of a Star, or with any portion of the Ecliptick in an Oblique Sphere.

Oblique Descension is that part which sets therewith.

Ascensional Difference is an Arch of Difference between the Right and Oblique Ascension or Descension.

The Amplitude of the Sun is the Distance of the rising or setting thereof, from the East and West Points of the Horizon.

P R O B. I.

To find the Sun's Declination at any time.

As Radius or Sine 90 deg.

To Sine of the Distance or Longitude of the Sun from the next Equinoctial Point;

So is the Sine of the Sun's greatest Declination.

To the Sine of the Sun's present Declination.

P R O B. II.

To find the Sun's Right Ascension.

As the Radius

To the Sine of the Complement of the Sun's greatest Declination:

So the Tangent of the Longitude of the Sun from the next Equinoctial Point.

To the Tangent of the Right Ascension of the Sun from the same Equinoctial Point.

P R O B. III.

To find the Sun's Ascensional Difference.

As Radius

To the Tangent of the Poles height;

So the Tangent of the Sun's Declination,

To the Sine of the Sun's Ascensional Difference,

Which brought into Hours and Minutes, and added to, or subtracted from the hour of six, shews the Sun's rising and setting.

P R O B.

P R O B. IV.

To find the Sun's Amplitude.

As the Sine Complement of the Poles height,
To the Sine of the Sun's Declination;
So is Radius
To the Sine of the Sun's Amplitude.

P R O B. V.

To find the Sun's Horary Distance from the Meridian, when he is due East or West.

As the Tangent of the Poles height,
Is to the Radius;
So the Tangent of the Sun's Declination,
To the Sine of the Sun's Horary distance from the Six,
being just East or West.

P R O B. VI.

To find the Altitude of the Sun, being just East or West.

As the Sine of the Poles height,
Is to the Radius;
So the Sine of the Sun's Declination,
To the Sine of the Sun's height being just East or West.

P R O B. VII.

To find the Sun's Altitude at the Hour of Six.

As the Radius,
To the Sine of the Poles height;
So the Sine of the Sun's Declination;
To the Sine of the Sun's height at the Hour of Six.

P R O B. VIII.

To find the Sun's Azimuth at the Hour of Six.

As the Radius,
To the Co-sine of the Poles height;
So the Tangent of the Sun's Declination,
To the Tangent of the Sun's Azimuth from the East or
West at the Hour of six.

P R O B.

P R O B. IX.

To find the Sun's Altitude at any time of the day:

As the Radius,

To the Co-tangent of the Poles height;

So is the Sine of the Sun's Distance from the hour of six,

To the Tangent of an Arch.

Which being subtracted out of the Sun's Distance from the Pole, call it the remaining Arch.

As the Co-sine of the Arch found,

To the Co-sine of the remaining Arch;

So is the Sine of the Poles height,

To the Sine of the Sun's Altitude at the hour required.

P R O B. X.

To find the Hour of the Day by the Height of the Sun.

Take the Complement of the Sun's height, the Complement of the Latitude of the place, and the Complement of the Declination of the Sun, or Distance from the elevated Pole, and add these three Sides together, and find the Difference between their half sum and the Complement of the Sun's Altitude, then work thus,

To the Complement Arithmetical of the Logarithm Sines of the Co-latitude and Co-declination, or Sun's Distance from the Pole,

Add the Logarithm of the Sines of the half sum and Difference:

Half the sum of these four Logarithms is the Sine of an Arch, whose Complement being doubled, will be the Distance of the Sun from the Meridian; which converted into Time will shew the Hour of the Day.

P R O B. XI.

To find the Azimuth by the Sun's Height.

Take the Complement of the Sun's Declination or Distance from the elevated Pole, the Complement of the Latitude, and

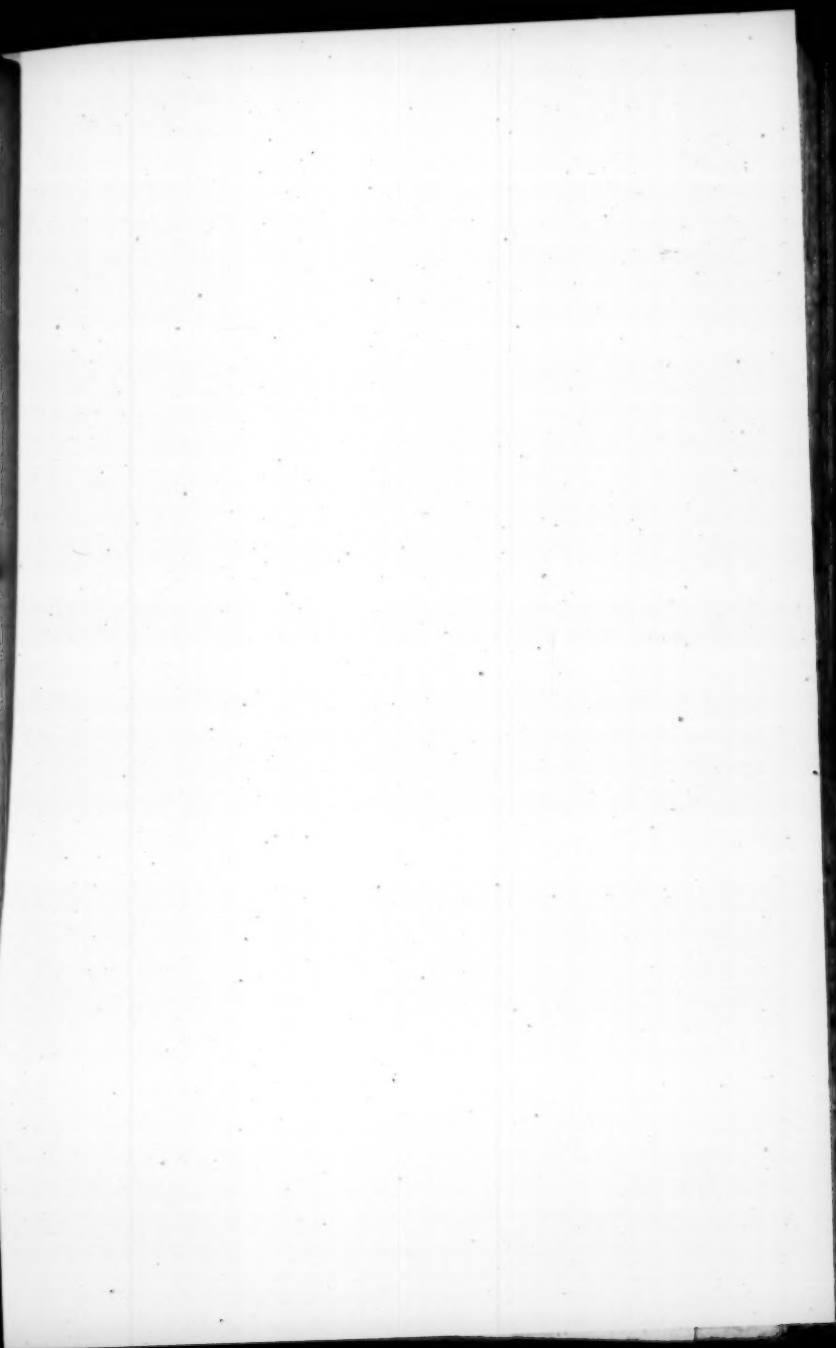
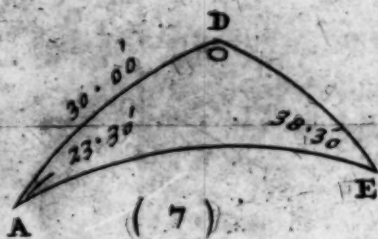
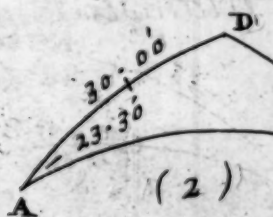
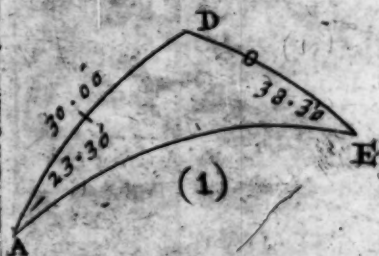
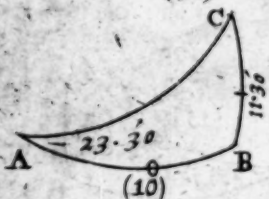
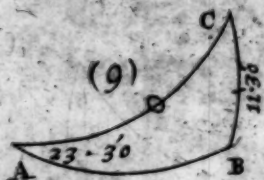
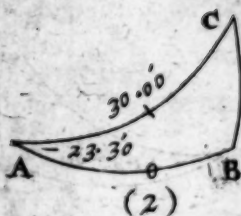
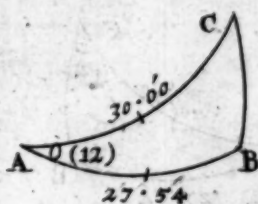
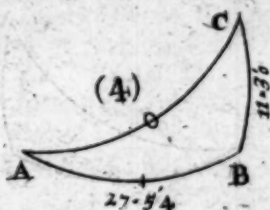


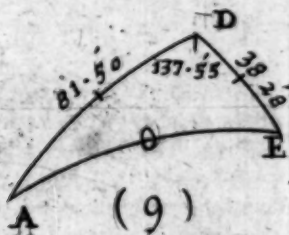
Plate II.



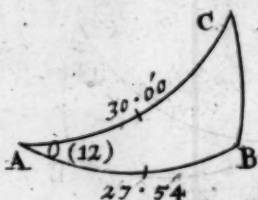
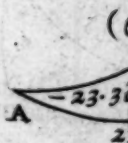
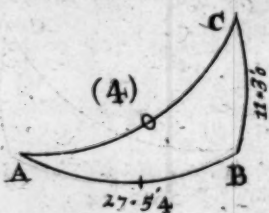
The 16 Cases of a Right Angled Sp



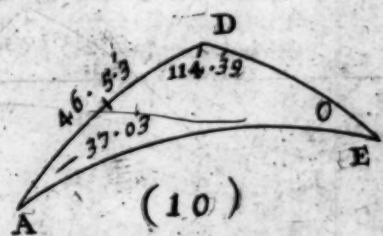
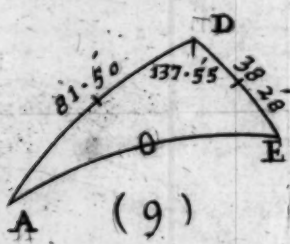
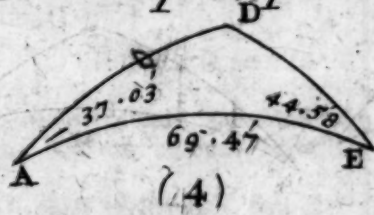
The Twelve Cases of an Oblique



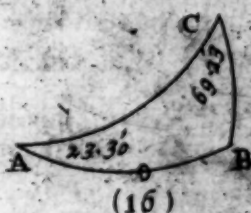
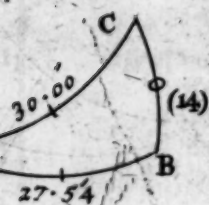
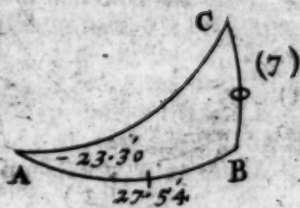
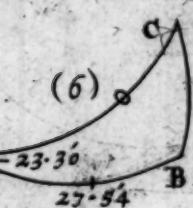
he 16 Cases of a Right Angled Spherical



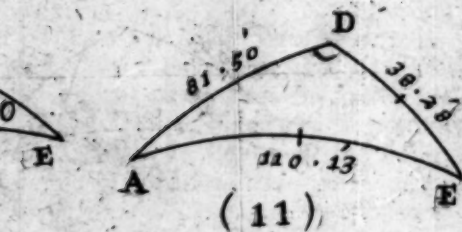
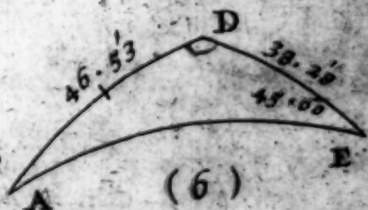
The Twelve Cases of an Oblique Spherical

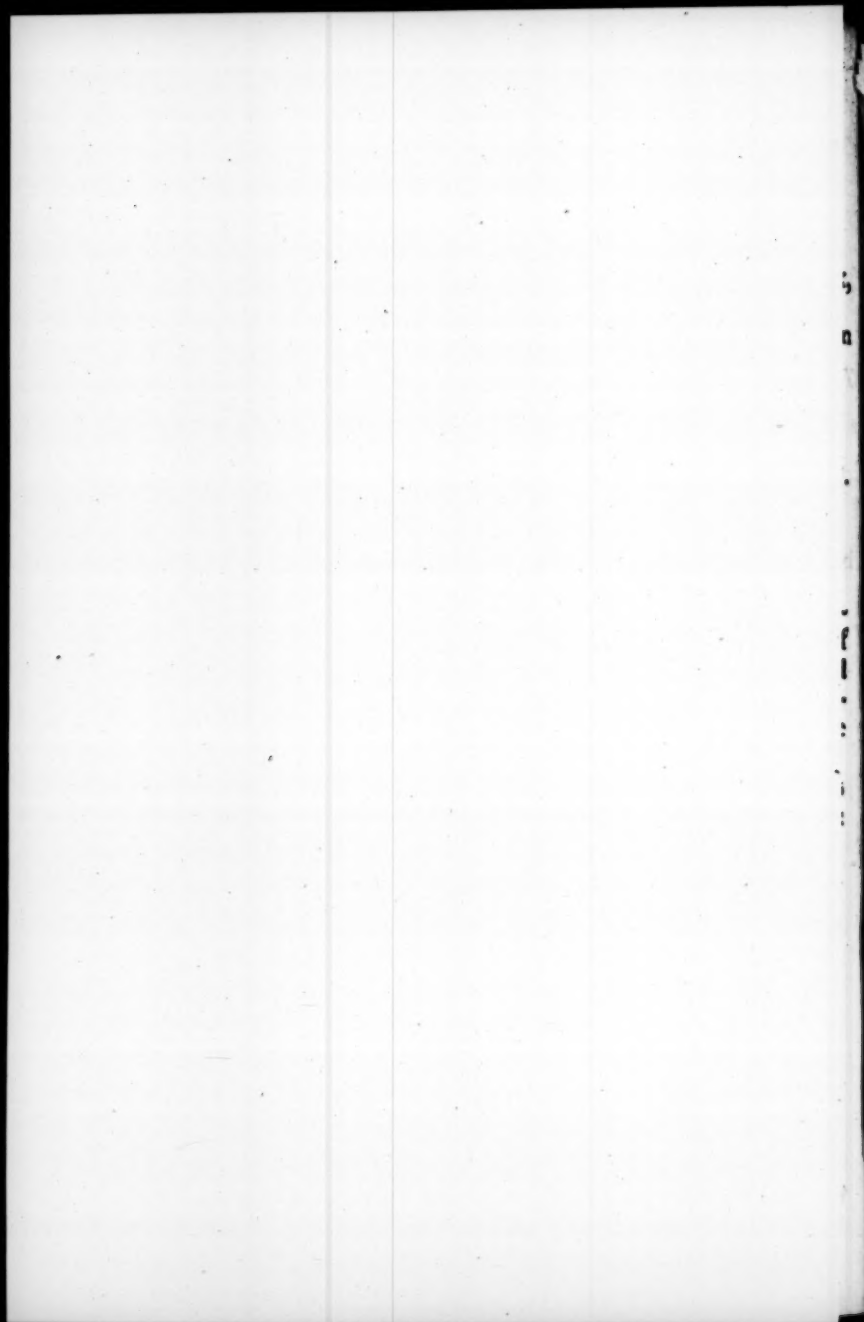


cal Triangle



rical Triangle





and the Complement of the Sun's height, and add these three sides together, and find their Difference between their half sum, and the Distance from the Pole, then work thus,

To the Complement Arithmetical of the Logarithm Sines of the Co-altitude and Co-latitude,

Add the Logarithm Sines of the half sum and Difference;

Half the sum of these four Logarithms is the Sine of an Arch, whose Complement being doubled, is the Azimuth desired.

P R O B. XII.

Having the Sun's Azimuth and Altitude, to find the Hour.

As the Sine Complement of the Sun's Declination,

To the Sine of the Sun's Azimuth;

So the Sine Complement of the Sun's height,

To the Sine of the Sun's Horary Distance from the Meridian.

P R O B. XIII.

Having the Longitude and Latitude of any Star, to find the Right Ascension and Declination thereof.

1. As the Radius,

To the Sine of the Stars Longitude, from the next Equinoctial Point:

So the Co-tangent of the Stars Latitude,

To the Tangent of a fourth Arch.

Compare this fourth Arch with the Arch of Distance between the Poles of the World and the Ecliptick, 23 d. 30 m. and if the Latitude and Longitude of the Star be both of one quality, that is, when the Star hath North Latitude in the six Northern Signs Υ φ Π \varnothing Ω ν , or South Latitude in the six Southern Signs ϖ ι τ φ χ ψ , then shall the Difference between this fourth Arch, and the Distance of the Poles 23 d. 30 min. be your fifth Arch.

But if the Longitude and Latitude of the Star be of contrary qualities, that is, one Northern and the other Southern, then add this fourth Arch to the Distance of the Poles 23 d. 30 m. and the Sum thereof shall be your fifth Arch; with which proceed.

2. As the Sine of the fourth Arch,
 To the Sine of the fifth Arch;
 So the Tangent of the Stars Longitude, from the next Equinoctial Point,
 To the Tangent of the Stars right Ascension from the next Equinoctial Point.

3. As the Cosine of the fourth Arch,
 To the Cosine of the fifth Arch;
 So the Sine of the Stars Latitude,
 To the Sine of the Stars Declination.

Lastly, for Proof of your Work.

4. As the Cosine of the Stars Latitude,
 To the Cosine of the Stars right Ascension;
 So the Cosine of the Declination,
 To the Cosine of the Longitude,

And thus having found the right ascension and Declination of any Star, you may by the former Rules find its Amplitude, its Difference of Ascension, its Distance from the Meridian at any height observ'd, and so the Hour of the Night thereby, having first the time of its coming to the South, by subtracting the Right Ascension of the Sun, from the Right Ascension of the Star; adding 360 deg. to the Stars Right Ascension, when it is less than the Suns.

C H A P. VIII.

Containing Problems of Geography.

P R O P. I.

To find the Distance of any two Places which differ only in Latitude, being both upon the same Meridian.

1. **I**F the two places are upon the same side of the Equinoctial; subtract the lesser Latitude out of the greater, the Remainder is the Distance required.

2. If the one place be on the one side of the Equinoctial and the other on the other; Add the two Latitudes together, and the sum is the Distance required,

P R O P.

P R O P. II.

To know the Distance of any two Places, which differ only in Longitude.

1. If the places are both of them under the Equinoctial, subtract the lesser Longitude out of the greater, the Remainder is the Distance.

2. If the two places have the same Latitude, and so under the same parallel, then,

As the Radius,

to the Cosine of their Latitude :

So the sine of half their Difference of Longitude,

To the Sine of half their Distance.

P R O P. III.

To find the Distance of two places which differ both in Longitude and Latitude.

This Proposition hath three Cases.

C A S E I.

When one place is under the Equinoctial, and the other towards either of the Poles, Then,

As the Radius,

To the Cosine of their Difference of Longitude :

So the Cosine of their Latitude,

To the Cosine of the Distance.

C A S E II.

When both places are towards one of the Poles. First,

As the Radius,

To the Cosine of the Difference of Longitude :

So the Co-tangent of the lesser Latitude,

To the Tangent of a fourth Arch.

Which being subtracted out of the Complement of the greater Latitude, the Remainder must be your fifth Arch : Then,

As the Cosine of the fourth Arch,

To the Cosine of the fifth Arch :

So the Sine of the lesser Latitude,

To the Cosine of the Distance required.

CASE III.

When one place is toward the North Pole, and the other towards the South Pole; First,

As the Radius,

To the Cosine of their Difference of Longitude :

So the Cotangent of one of the Latitudes,

To the Tangent of a fourth Arch.

Which being subtracted out of the sum of the other Latitude, and 90 deg. the Remainder is the fifth Arch : Then,

As the Cosine of the fourth Arch :

To the Cosine of the fifth Arch :

So the Sine of the Latitude first taken,

To the Cosine of their Distance.

By these Rules also, you may find the Distance of any two Stars, if you know their Longitude and Latitude, or their Right Ascension and Declination, which is of good use in Astronomy.

How to find the Variation of the Compass.

BY the fourth Problem of the seventh Chapter you may find the Suns Amplitude by Calculation, which I call the true Amplitude, and by the Amplitude Compass you may observe the Suns Amplitude either at Sun rising or setting, which I call the Magnetical (or Compass) Amplitude. If these two Amplitudes agree (which is very seldom,) there is no Variation, but if they do not agree, the Difference between them being rightly accounted, is the Variation of the Compass.

Likewise by the eleventh Problem of the seventh Chapter you may find the Suns Azimuth by Calculation, which I call the true Azimuth, and by the Azimuth Compass you may observe the Suns Azimuth, either in the Forenoon or Afternoon the Sun about 10 or 15 d. high, and this I call the Magnetical Azimuth.

Note, you may see the use of the Azimuth Compass, in observing the Magnetical Azimuth or Amplitude, in a useful Treatise called Practical Navigation.

Example.

Example.

Suppose the true Amplitude be East 32 d. Northerly, and the Magnetical Amplitude East 27 d. Northerly, the Difference is 5 d. which is the Variation, almost half a Point of the Compass.

Suppose the true Azimuth to be West 12 d. 30 m. Southerly, and the Magnetical to be West 14 d. 30 m. Northerly, 12 d. 30 m. added to 14 d. 30 m. the one being Northerly and the other Southerly, make the Difference between the Azimuths to be 27 d. and that is the Variation almost two points and an half of the Compass.

To find which way the Compass varies.

Supposing your self to look directly towards the Coast of the true Amplitude or Azimuth, consider whether the Magnetical Amplitude or Azimuth be towards the right or towards the left hand; if it be towards the right hand the Variation is Westerly, if towards the left, Easterly.

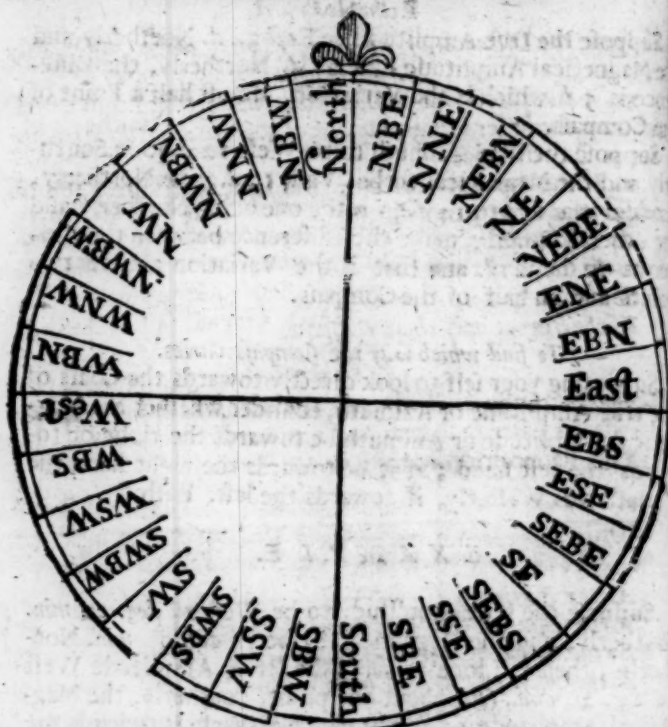
E X A M P L E.

Suppose the true Amplitude to be West 12 deg. 30 min. Southerly, and the Magnetical to be 14 deg. 30 min. Northerly; then if I look towards the true Amplitude West 12 deg. 30 min. (for about one point) Southerly, the Magnetical Amplitude 14 deg. 30 min. Northerly is towards the right hand, and therefore the Variation is Westerly 27 deg.

Suppose the true Azimuth to be W. N. W. and the Magnetical W. B. S. if you look towards the W. N. W. then the W. B. S. is on your left hand, and the Variation is Easterly three Points.

But this Proposition may be performed most readily by the following Instrument, which may be called the Rectifier; the Description whereof is here inserted.

This



This represents two Compasses, the one fixed, the other moveable, the fixed Compass may represent the Horizon, in the which the North Point and all the other Points of the Compass are fixed and immoveable. The moveable one represents the Marriners Compass, in which the North Point and consequently the other Points are liable to Variation; and if the North Point of the Marriners Compass lie to the Eastward of the true North in the Horizon, the Variation is Easterly; if it lie to the Westward, the Variation is Westerly.

Example.

Suppose the true Azimuth be, as before, W. N. W. and the Magnetical W. B. S. Place the W. B. S. Point of the moveable

moveable Compass to the W.N.W. point of the immoveable, when the North point of the moveable Compass stands at the E. B. N. point of the immoveable, which shews the Variation is three points Easterly as before.

Suppose the true Amplitude S. W. and the Magnetical S. W. place the W. S. W. point of the moveable Compass to the S. W. point of the immoveable Compass, then shall the North point of the moveable stand at the N.N.W. point of the immoveable, which shews that the Variation is two points Westerly.

How to rectifie your Course when the Compass varies.

This may be very readily performed by the foregoing Instrument.

Example.

Suppose the Variation be 2. points Easterly, and the Course by the Compass is S. W. B. S. to find the true Course, the Variation being allowed.

Place the North point of the moveable Compass, to the N. N. E. point of the immoveable, because the Variation is 2 points Easterly, then the S. W. B. S. point of the moveable Compass will stand at the S. W. B. W. point of the immoveable which is the true Course required.

My Course that I should steer is S. E. B. E. but the Compass varies two points and an half Westerly, what Course must I steer to allow the Variation?

Place the North point of the moveable Compass to N.N.W. half W. on the immoveable, then right against S. E. B. E. the true Course on the immoveable stands S. S. E. half E. on the moveable Compass, which is the Course you must steer to allow for the Variation of the Compass.

If any thing seem obscure in this small Treatise, it being only an *Epitome of Navigation*, we refer the Reader to a Book Entituled *Practical Navigation*, where he may receive ample Satisfaction; and likewise see the Use of most Instruments in Navigation.

- Several

Several
T A B L E S
Necessary in
Navigation.

With their Uses briefly explained
in the Order following.

- I. A Table of Meridional Parts.
- II. A Table of the Sun's Right Ascension.
- III. A Table of the Right Ascensions and Declinations of the principal fixed Stars.
- IV. A Table of the Sun's Declination newly calculated.
- V. A Table of the Latitudes and Longitudes of the Principal Ports, Harbours, Capes and Islands in the World.
- VI. A Table of Difference of Latitude and Departure for the exact working a Traverse.
- VII. A Table shewing the first Day of *March*, *Epact*, Dominical Letter, with a Perpetual Almanack.
- VIII. A Table of the Angles which every Rumb (or Point of the Compass) maketh with the *Meridian*.
- IX. A Table of Sines and Tangents to every Degree and Minute of the Quadrant.
- X. A Table of Logarithms, increasing from 1 to 10000, carefully Corrected and exactly Printed.

L O N D O N, Printed for R. Mount, 1698.

Deg. of Lat.	A Table of Meridional Miles.						Difference.
	The Minutes of each Degree.						
	0	10	20	30	40	50	
	The Meridional Miles.						
0	0	10	20	30	40	50	10
1	60	70	80	90	100	110	10
2	120	130	140	150	160	170	10
3	180	190	200	210	220	230	10
4	240	250	260	270	280	290	10
5	300	310	320	330	340	350	10
6	361	371	381	391	401	411	10
7	421	431	441	451	461	471	10
8	481	492	502	512	522	532	10
9	542	552	562	572	583	592	10
10	603	613	623	633	644	654	10
11	664	674	684	695	705	715	10
12	725	735	746	756	766	776	10
13	787	797	807	817	828	838	10
14	849	858	869	879	890	900	10
15	910	922	931	941	952	962	10
16	973	983	993	1004	1014	1025	10
17	1035	1046	1056	1067	1077	1088	10
18	1098	1109	1119	1130	1140	1151	10
19	1161	1172	1183	1193	1204	1214	10
20	1225	1236	1246	1257	1268	1278	11
21	1289	1300	1311	1321	1332	1343	11
22	1354	1364	1375	1386	1397	1408	11
23	1419	1429	1440	1451	1462	1473	11
24	1484	1495	1505	1517	1528	1539	11
25	1550	1561	1572	1583	1594	1605	11
26	1616	1628	1639	1650	1661	1672	11
27	1683	1694	1705	1717	1728	1740	11
28	1751	1762	1774	1785	1797	1808	11
29	1819	1831	1842	1854	1865	1877	11

Deg. of Lat.	A Table of Meridional Miles.						Difference.
	The Minutes of each Degree.						
	0	10	20	30	40	50	
	The Meridional Miles.						
30	1888	1900	1911	1923	1935	1946	12
31	1958	1970	1981	1993	2005	2017	12
32	2028	2040	2052	2064	2076	2088	12
33	2099	2011	2123	2135	2147	2159	12
34	2171	2183	2106	2208	2222	2231	12
35	2244	2256	2269	2281	2293	2306	12
36	2318	2330	2343	2355	2368	2380	12
37	2393	2405	2418	2430	2443	2456	12
38	2468	2481	2494	2506	2519	2532	13
39	2545	2558	2571	2584	2597	2610	13
40	2623	2636	2649	2662	2675	2688	13
41	2702	2715	2728	2741	2755	2768	13
42	2782	2795	2809	2822	2836	2849	13
43	2863	2877	2890	2904	2918	2932	14
44	2946	2960	2974	2986	3001	3016	14
45	3030	3044	3058	3073	3187	3101	14
46	3116	3130	3144	3159	3173	3188	14
47	3202	3217	3232	3247	3261	3277	15
48	3292	3307	3322	3337	3352	3367	15
49	3382	3397	3413	3428	3443	3459	15
50	3475	3490	3506	3521	3537	3553	16
51	3569	3585	3600	3617	3633	3649	16
52	3665	3682	3698	3714	3731	3747	16
53	3765	3780	3797	3814	3831	3848	17
54	3865	3882	3899	3916	3933	3952	17
55	3968	3986	4003	4021	4038	4056	18
56	4074	4092	4110	4128	4146	4164	19
57	4183	4201	4220	4238	4257	4276	19
58	4294	4313	4332	4351	4371	4390	20
59	4409	4429	4448	4468	4488	4508	20

Deg. of Lat.	A Table of Meridional Miles.						Difference.
	The Minutes of each Degree.						
	0	10	20	30	40	50	
	The Meridional Miles.						
60	4528	4548	4568	4588	4608	4629	20
61	4649	4670	4691	4712	4733	4754	21
62	4775	4794	4818	4840	4861	4883	22
63	4905	4927	4950	4972	4994	5017	23
64	5040	5062	5086	5109	5132	5156	23
65	5179	5203	5227	5251	5275	5299	24
66	5324	5349	5373	5398	5424	5449	25
67	5474	5500	5526	5552	5578	5605	26
68	5631	5658	5685	5712	5740	5767	27
69	5795	5823	5851	5880	5909	5937	28
70	5967	5996	6026	6055	6085	6116	30
71	6146	6177	6208	6240	6271	6303	31
72	6336	6368	6401	6434	6468	6501	33
73	6535	6570	6605	6639	6675	6711	35
74	6747	6783	6820	6857	6895	6933	37
75	6971	7010	7050	7089	7130	7170	40
76	7211	7253	7295	7338	7381	7424	43
77	7469	7513	7559	7609	7651	7698	46
78	7746	7795	7844	7894	7944	7995	50
79	8047	8100	8154	8208	8264	8320	55
80	8377	8435	8494	8555	8616	8678	60
81	8741	8806	8872	8939	9007	9077	68
82	9148	9221	9295	9371	9449	9528	77
83	9609	9692	9777	9865	9954	10046	88
84	10148	10238	10338	10441	10547	10656	105
85	10770	10886	11007	11133	11263	11398	123
86	11539	11686	11839	11999	12167	12344	165
87	12521	12718	12927	13150	13388	13643	230
88	13920	14220	14550	14914	15321	15783	386
89	16317	16950	17426	18729	20152	22623	

A Table of Proportional Parts.

D.	1	2	3	4	5	6	7	8	9
10	1	2	3	4	5	6	7	8	9
11	1	2	3	4	5	7	8	9	10
12	1	2	4	5	6	7	8	10	11
13	1	3	4	5	7	8	9	10	12
14	1	3	4	6	7	8	10	11	13
15	1	3	4	6	7	9	10	12	13
16	2	3	5	6	8	10	11	13	14
17	2	3	5	7	8	10	12	14	15
18	2	4	5	7	9	11	13	14	16
19	2	4	6	8	9	11	13	15	17
20	2	4	6	8	10	12	14	16	18
21	2	4	6	8	10	13	15	17	19
22	2	4	7	9	10	13	15	18	20
23	2	5	7	9	11	14	16	18	21
24	2	5	7	10	12	14	17	19	22
25	2	5	7	10	12	15	17	20	22
26	3	5	8	10	13	16	18	21	23
27	3	5	8	11	13	16	19	22	24
28	3	6	8	11	14	17	20	22	25
30	3	6	9	12	15	18	21	24	27
33	3	7	10	13	16	20	23	26	30
35	3	7	10	14	17	21	24	26	31
37	4	7	11	15	18	22	26	30	33
40	5	8	12	16	20	24	28	32	36
55	5	11	16	22	27	33	38	44	49
60	6	12	18	24	30	36	42	48	54
68	6	13	20	27	34	40	47	54	61
77	7	15	23	30	38	46	53	61	69
88	8	17	26	35	44	52	61	70	79
105	10	21	31	42	52	63	73	84	94
128	12	25	38	51	64	76	89	102	115
165	16	33	49	66	82	99	115	132	148
230	23	46	69	92	115	138	161	184	207
286	38	77	115	154	193	231	270	308	347

The Use of the Table, &c.

The Use of the Table of Meridional Parts.

THIS Table sheweth the Meridional parts for any Degree or Minute of Latitude. In the first Column towards the left hand are the Degrees of Latitude, from 1 to 89 *d.* in the second, third, fourth, fifth, sixth and seventh Columns, are every 10 Minutes of Latitude, answering to the Degree in the first Column, and are distinguished with 0, 10, 20, 30, 40 and 50 Minutes: In the last Column towards the right-hand, are the Differences in Meridional parts to every ten Minutes of Latitude: By the help of which and the foregoing Table of Proportional Parts the Meridional Parts may be found to every Minute of Latitude.

Example.

Suppose the Latitude be 17 *d.* 10 *m.* to find the Meridional Parts.

Right against 17 *d.* in the first Column, and under 10 *m.* in the third Column you will find the Meridional Parts to be 1046.

Suppose you were to find the Meridional Parts answering to the Latitude 74 *d.* 50 *m.*

Right against 74 *d.* in the first Column, and under 50 *m.* in the seventh Column you will find 6933, which are the Meridional Parts required.

The Use of the Table of Proportional Parts.

THE Use of this Table is to find the Meridional Parts to every Minute of Latitude.

Example.

Suppose it were required to find the Meridional Parts for the Latitude 29 *d.* 17 *m.*

First, find the Meridional Parts for the Latitude 29 *d.* 10 *m.* being the next, which is less than 17, which you will

E 3

find

The Use of the Table, &c.

find to be 1831; and right against 29 *d.* in the Column of Difference you will find 11; with this Difference go to the Table of Proportional Parts, and look 11 in the first Column under *D.* which stands for *Difference*, and because 17 *m.* is 7 more than 10, look under 7, at the Top of the 8th. Column, so right against 11 and right under 7 you will find 8, which added to 1831, makes 1839, the Meridional Parts required.

Suppose you were required to find the Meridional parts for the Latitude 45 *d.* 36 *m.*

The next less than 36 *m.* is 30 *m.* therefore find the Meridional Parts for 45 *d.* 30 *m.* which are 3101, and right against 45 *d.* the difference in the last Column is 14. 36 *m.* is 6 *m.* above 30, therefore in the Table of Proportional Parts right against 14 and under 6, you will find the Proportional Part to be 8, which added to 3101, makes 3109, the Meridional Parts required.

A Table

A Table of the Sun's Right Ascension.

Days	Januar.		Februa.		March		April		May		June	
	Ascens.		Ascens.		Ascens.		Ascens.		Ascens.		Ascens.	
	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.
1	19	35	21	42	23	28	1	21	3	14	5	19
2	19	39	21	46	23	32	1	25	3	18	5	23
3	19	43	21	50	23	36	1	29	3	22	5	27
4	19	47	21	54	23	39	1	33	3	26	5	31
5	19	51	21	58	23	43	1	36	3	30	5	36
6	19	56	22	02	23	46	1	40	3	34	5	40
7	20	00	22	06	23	50	1	44	3	38	5	44
8	20	04	22	10	23	53	1	47	3	42	5	48
9	20	09	22	14	23	57	1	51	3	46	5	52
10	20	13	22	17	0	01	1	54	3	50	5	56
11	20	17	22	21	0	05	1	58	3	54	6	00
12	20	22	22	25	0	08	2	02	3	58	6	04
13	20	26	22	29	0	12	2	06	4	02	6	08
14	20	30	22	33	0	15	2	10	4	06	6	12
15	20	34	22	36	0	19	2	13	4	10	6	17
16	20	38	22	40	0	23	2	17	4	14	6	21
17	20	42	22	44	0	26	2	21	4	18	6	25
18	20	46	22	48	0	30	2	25	4	22	6	29
19	20	50	22	52	0	33	2	29	4	26	6	33
20	20	54	22	55	0	37	2	32	4	30	6	38
21	20	58	22	59	0	41	2	36	4	34	6	42
22	21	03	23	03	0	44	2	40	4	38	6	46
23	21	07	23	06	0	48	2	44	4	42	6	50
24	21	11	23	10	0	52	2	48	4	46	6	54
25	21	15	23	13	0	55	2	51	4	50	6	58
26	21	19	23	17	0	59	2	55	4	54	7	02
27	21	23	23	21	1	03	2	59	4	58	7	06
28	21	27	23	25	1	06	3	03	5	02	7	10
29	21	31			1	10	3	07	5	06	7	14
30	21	35			1	14	3	10	5	11	7	19
31	21	38			1	17			5	15		

A Table of the Sun's Right Ascension.

Days	July		August		Septem.		October		Novem.		Decem.	
	Ascens.		Ascens.		Ascens.		Ascens.		Ascens.		Ascens.	
	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.
1	7	23	9	25	11	19	13	08	15	07	17	15
2	7	27	9	29	11	23	13	12	15	11	17	20
3	7	31	9	33	11	26	13	15	15	15	17	25
4	7	35	9	37	11	30	13	19	15	19	17	29
5	7	39	9	40	11	33	13	22	15	23	17	34
6	7	43	9	44	11	37	13	26	15	27	17	38
7	7	47	9	48	11	41	13	30	15	31	17	42
8	7	51	9	51	11	44	13	34	15	36	17	47
9	7	55	9	55	11	48	13	38	15	40	17	51
10	7	59	9	58	11	51	13	41	15	45	17	56
11	8	03	10	02	11	55	13	45	15	49	18	00
12	8	07	10	06	11	55	13	49	15	53	18	05
13	8	11	10	10	12	02	13	53	15	58	18	09
14	8	15	10	14	12	06	13	57	16	02	18	14
15	8	19	10	17	12	09	14	00	16	07	18	19
16	8	23	10	21	12	13	14	04	16	11	18	24
17	8	27	10	25	12	17	14	08	16	15	18	28
18	8	31	10	28	12	20	14	12	16	19	18	33
19	8	35	10	32	12	24	14	16	16	23	18	37
20	8	39	10	35	12	27	14	20	16	28	18	41
21	8	43	10	39	12	31	14	24	16	32	18	45
22	8	47	10	43	12	35	14	28	16	36	18	49
23	8	51	10	46	12	38	14	32	16	40	18	54
24	8	55	10	50	12	42	14	36	16	44	18	58
25	8	58	10	53	12	45	14	39	16	49	19	03
26	9	02	10	57	12	49	14	43	16	53	19	07
27	9	06	11	01	12	53	14	47	16	57	19	11
28	9	10	11	04	12	57	14	51	17	02	19	16
29	9	14	11	08	13	01	14	55	17	06	19	20
30	9	17	11	11	13	04	14	59	17	11	19	25
31	9	21	11	15		08	15	03		19	19	30

A Table of the Fixed Stars.

A Table of the Right Ascension and Declination of some of the most Notable fixed Stars.

Stars Names.	Magn.	Right Ascensi.		Declination.		Z. or S.
		H.	M.	D.	M.	
Pole Star	2	00	32	87	33	N
The upper of the two foremost of the square in the little Bear.	2	14	51	75	36	N
The upper of the two foremost of the square in the great Bear.	2	10	43	63	32	N
The lower of the two foremost of the square in the great Bear.	2	10	41	58	08	N
The lower of the two latter of the square in the great Bear.	2	11	36	55	33	N
The upper of the two latter in the square of the great Bear.	2	11	59	58	51	N
Last but two in the great Bear's Tail.	2	12	40	57	47	N
Last but one in the same	2	13	10	56	41	N
Last in the same	2	13	34	51	00	N
The Dragon's Tail	2	13	55	55	56	N
Arcturus	1	14	01	20	58	N
Brightest in the Crown	2	15	21	27	51	N
Brightest in the Harp	1	18	26	38	30	N
Swans Tail	2	20	30	44	05	N
Perseus Right side	2	02	57	48	36	N
Goat or Capella	1	04	52	45	37	N
Auriga's Right Shoulder	2	05	44	44	56	N
Brightest in the Serpent's Neck	2	15	28	07	30	N
Brightest between the Eagles Shoulders	2	19	35	08	03	N
First in Pegasus wing or Marchab	2	22	48	13	28	N
Beginning of Pegasus Leg	2	22	48	26	18	N
End of Pegasus Wing	2	23	57	13	22	N
Andromeda's Head	2	23	52	27	18	N

Southernmost

A Table of the Fixed Stars.

<i>Southermost in Andromedas girdle</i>	2	00	51	33	55 N
<i>Andromedas southermost Foot</i>	2	01	44	40	44 N
<i>The Bulls Eye, or Aldebaran</i>	1	04	17	15	48 N
<i>End of the Bulls horn</i>	2	05	06	28	21 N
<i>Castor</i>	2	07	14	32	33 N
<i>Pollux</i>	2	07	25	28	45 N
<i>Bright Foot of Gemini</i>	2	06	19	16	38 N
<i>Brightest in the Lions Neck</i>	2	10	02	21	29 N
<i>Lions Heart</i>	1	09	51	13	33 N
<i>Lions Tail</i>	1	11	32	16	25 N
<i>Virgins Spike</i>	1	13	08	09	31 S
<i>Southermost scale of Libra</i>	2	14	33	14	37 S
<i>Northermost Scale of Libra</i>	2	14	59	08	07 S
<i>Scorpions Forehead</i>	2	15	46	18	51 S
<i>Scorpions Heart</i>	1	16	10	25	37 S
<i>Fornahant</i>	1	23	39	31	17 S
<i>Whales Jaw</i>	2	02	45	02	48 N
<i>Orions Right Shoulder</i>	2	05	38	07	18 N
<i>Orions Left Shoulder</i>	2	05	08	06	01 N
<i>First in Orions Belt</i>	2	05	15	00	35 S
<i>Middle of Orions Belt</i>	2	05	20	01	26 S
<i>Last in Orions Belt</i>	2	05	24	02	09 S
<i>Orions Left Foot, or Regel</i>	1	04	59	08	37 S
<i>Mouth of the great Dog, or Sirius</i>	1	06	31	16	14 S
<i>Right Fore foot of the great Dog</i>	2	06	09	17	49 S
<i>Little Dogs Thigh</i>	2	07	22	06	03 N
<i>Hydras Heart</i>	1	09	12	07	15 S

To know the Hour when any Star cometh upon the Meridian any day of the Month.

The R U L E.

First seek the Right Ascension of that Star required in the foregoing Tables (of the Right Ascension of the Stars) and also the Right Ascension of the Sun for the day of the month, from the Right Ascension of the Star subtract the Right Ascension of the Sun; but when the Right Ascension

of

The Use of the Tables, &c.

of the Star is less than the Right Ascension of the Sun, then add 24 hours thereto, and the Remainder will shew you the hour after noon when the Star comes upon the Meridian, and if it do exceed 12 hours, then substract 12 hours therefrom, and the Remainder shall shew the hour and Minute of the Stars coming upon the Meridian after midnight.

Example 1.

Upon the tenth of April I would know when the Lions Heart cometh upon the Meridian. Therefore if you look in the Tables of Right Ascension for that Star, you will find it to be 9 h. 51 m. Then look in the Tables of Right Ascension of the Sun, and right against the tenth of April you will find the right Ascension of the Sun to be 1 h. 54 m. which substracted from the Right Ascension of the Star, there remains 7 h. 57 m. which is the true time that the Star cometh to the Meridian afternoon.

Example 2.

Upon the fifth of November, I desire to know when the Bulls Eye cometh upon the Meridian: The Right Ascension thereof by the Tables you will find to be 4 h. 17 m. the right Ascension of the Sun that day is 15 h. 23 m. Therefore because the right Ascension of the Star is less than the right Ascension of the Sun, I add 24 hours to the right Ascension of the Star, which maketh 28 h. 17 m. From which substract the Right Ascension of the Sun, and the Remainder is 12 h. 54 m. from which I substract the 12 hours, and the Remainder is 54 minutes after Midnight, then the said Star cometh upon the Meridian.

And here note, That the Table of Right Ascension of the Sun, is calculated for noon every day; and that it doth increase by about 4 minutes each day; so that it may be proportioned for every six hours to allow one minute for the time after noon.

A Table of the Latitude and Longitude of the Principal Ports, Harbours, Head-lands and Islands in the World ; beginning from the Meridian of *Pico Teneriffa*, newly corrected according to the best Observation.

Those Places which are in South Latitude are marked with the Letter S. all the rest are in North Latitude.

		Latitu.		Longit.	
		D.	M.	D.	M.
Green-Land.	H Acklits Headland	79	50	26	55
	Fair Foreland	79	15	24	50
	Point look out	76	25	32	00
	Cape Blanco	78	25	38	00
	Hopeless Isles	77	00	42	30
	Hope Island	76	13	41	50
	Cherry Island	74	34	34	10
The Sea-Coasts of Nova Zembla	Ice Point	77	45	50	50
	Admiralties Island	75	50	73	55
	Langeness	74	55	68	50
	Cross Point	72	25	68	05
	Fretum Burrough	70	40	75	00
	Mauritius Isle	71	24	72	10
Lapland and Norway	Archangel	63	22	55	28
	Cape Candense	69	35	58	02
	Fox Naze	64	12	37	07
	Cape Gallant	67	11	39	32
	Cape Race	65	49	40	04
	Island Kilduym	68	54	38	05
	North Cape	71	22	32	35
	Ross Isles	67	01	25	06
	Catsness	61	54	18	42
	Nase of Norway	58	00	21	02

A Table of Latitude and Longitude.

		D.	M.	D.	M.
The Sound	The Nyding	57	00	25	40
	Scarlet Island	56	02	26	38
	Falsterborn	56	53	26	29
	Abbo	61	08	34	30
	Dagaret	59	44	34	31
	Gotland	58	20	31	05
	Burnt Holm	56	00	28	16
Flanders	Elfenore	56	40	25	57
	The Scaw	57	52	24	27
	Bouenburgh	56	20	23	56
	Holy-land	54	30	22	14
	The Texel	53	20	20	56
	The Brill	52	08	19	44
	Calice	51	13	17	52
The Sea-Coasts of Ireland	Langeness	67	20	03	45
	Maze	68	15	35	10
	Snow-Hill	65	40	34	40
	Merchants Foreland	63	36	35	40
	Whale Back	65	18	00	30
Isles in Scot.	St. Kilda	58	02	05	56
	Sky Island	57	40	10	08
	Lewis Island	58	30	08	00
	Shetland	60	22	14	30
	Isles of Orkeney	58	50	13	29
England, Scotland	Catness	58	37	13	24
	Buchaness	58	00	14	32
	St. Abbs Head	56	25	14	12
	Tinmouth	55	08	15	00
	Flamborough Head	54	08	16	26
	The Sporne	53	45	16	58
	Wintertoness	52	52	18	00

A Table of Longitude and Latitude.

		D.	M.	D.	M.
England	Orfordness	52	20	18	02
	The North Foreland	51	32	17	40
	The South Foreland	51	22	17	42
	Dungeness	51	09	17	14
	Isle of Wight	50	24	14	47
	Portland	50	20	13	46
	The Start	50	27	13	09
	The Lizard	50	00	12	37
	Islands of Scilly	50	07	09	47
	Lundy Isle	51	22	11	57
Ireland	St. Davids Head	51	34	11	18
	Holy Head	54	44	11	44
	Isle of Man	54	25	11	45
	Fare Foreland	55	35	10	16
	Black Rock	53	32	06	00
	Slieve Head	53	16	06	00
	Blasques	52	15	05	20
	Cape Clear	51	15	06	26
	Old Head	51	40	07	32
	Hearn Point	52	05	10	04
Portugal, Spain, France,	Sain Head	50	04	16	50
	Cape Hage	50	04	15	05
	Garnsey	49	43	14	20
	Fersey	49	30	14	46
	Ushant	48	49	11	16
	Cape Ortegal	44	08	09	16
	Cape Finisterre	43	10	06	58
	The Rock of Lisbon	38	52	06	43
	Cape St. Vincent	37	00	07	20
	The Streights of Gibraltar	36	00	10	40

A Table of Latitude and Longitude.

The Main Continent of the Straits

Cape de Gata
Cape St. Martin
Cape Dago Frito
Cape Melle
Cape Sparteventura
Cape St. Maria
Cape St. Angelo
Cape Saradoni
Cape de Becur
Cape Rosato
Cape Bona
Tunis
Tangier

D.	M.	D.	M.
36	47	16	08
38	46	18	57
41	41	21	49
43	51	26	21
37	46	36	06
39	52	38	16
37	15	42	56
35	35	48	46
32	40	50	48
32	58	40	28
37	05	30	12
36	40	19	46
35	36	11	39

The Sea-Coasts of Islands within the Straits

Alboran
Formentara
Ivica
Majorca
Minorca
Cape Pulo in Sardinia
Cape Corso in Corsica
Limpadofa
Malta
Cape Passaro in Sicilia
Messina
Corfu
Cephalonia
Zant
West end of Candia
East end of Candia
Rhodes
West end of Cyprus
East end of Cyprus

37	52	15	18
38	44	19	38
39	09	19	50
39	38	21	20
39	55	22	30
38	56	27	36
42	51	27	32
55	58	31	52
36	00	33	12
37	10	34	52
38	07	35	08
39	25	39	18
38	28	40	29
37	37	40	40
35	15	43	60
35	04	46	28
35	40	48	00
34	22	51	34
34	48	54	35

The

A Table of Latitude and Longitude.

		D.	M.	D.	M.
Barbary and Guinny	Cape Spartel	35	38	11	35
	Cape Canten	32	27	07	35
	Cape Boiadat	26	55	02	24
	Cape Blanco	20	32	35	56
	Cape Verde	14	36	35	50
	Sirre Leone	08	00	03	32
	Cape de Palmas	04	10	10	00
	Cape tres Puntos	04	06	16	00
	The North Point of Fernando	03	25	27	25
	Island St. Thomas	00	10	27	30
The Sea-Coasts of Western Islands	Cape Lupus	01	50	27	40
	Cape Negro	16	50	30	50
	Cape Bona Esperanza	34	52	38	10
	The West side of Corua	40	00	34	30
	The West side of Flores	39	40	34	30
	The Road before Fial	38	50	34	47
	The West end of Pico	38	40	34	18
	The West end of Tercera	30	00	34	10
	The East end of St. Michael	38	00	35	40
	The East end of St. Maries	37	00	35	30
The Canary Islands	The North Part of Ferro	27	40	35	25
	The East end of Palma	28	36	35	43
	Pico Teneriffa	28	20	00	00
	The East end of Madera	32	32	00	10
	The East end of Port Santo	33	00	01	00
	The N. E. of Canaria	28	10	01	00
	The N. E. of Forteventura	28	20	02	50
	The East Part of Lancerotta	28	30	03	10

A Table of Latitude and Longitude.

		D.	M.	D.	M.
Cape de Verde Islands	The West side of St. Antonio	17	00	350	00
	The East point of St. Vincent	17	40	350	08
	The East side of St. Jago	15	00	352	30
	The East side of Isle de Mayo	15	00	353	04
	The East side of Bona Vista	15	00	353	04
	St. Matthews	01	54	11	32
	Ascension	08	50	04	30
	St. Helena	16	50	13	50
	St. Helena Nova	16	50	24	48
The Sea-Coasts of Main Continent in East-India	Cape Anguilhar	35	50	39	30
	Cape Corintes	23	53	56	00
	Cape de Guada	15	51	59	56
	Cape de Guardafin	11	40	74	15
	Cape de Rasalgate	22	07	84	10
	Surrat	21	04	96	20
	Goa	15	40	97	00
	Cape Comerin	07	52	99	12
	S. W. point of Ceylon	06	00	101	56
	River Bengale	20	09	110	20
	Syam	14	52	122	45
	Vischers Point	20	18	131	00
Islands in East-India	Point of Cavallos	25	16	140	58
	Corea	36	05	146	00
	John de Lisbon	25	52	75	52
	South end of St. Lawrence	25	53	78	00
	North end of St. Lawrence	11	50	73	00
	Mayotta	12	54	66	30
	St. Hermanos	03	50	84	00
	Diego Gratiofa	08	50	92	20
	The N. W. point of Sumatra	05	30	116	00
	The S. E. end of Sumatra	05	55	125	40

A Table of Latitude and Longitude.

	D.	M.	D.	M.
<i>Islands in the East-Indies</i>				
Bantam	06	51	126	30
Batavia	06	51	127	03
Flores	08	55	140	48
Amboyna	03	55	147	25
South end of Celebes	03	54	139	30
North point of Celebes	02	16	144	06
South point of Borneo	04	51	135	04
North point of Borneo	07	40	134	35
South end of Lucon	12	42	143	45
North end of Lucon	18	42	141	56
South end of Formosa	21	20	142	05
North end of Formosa	28	10	143	16
West end of Japan	34	00	150	05
North point of Japan	40	05	163	20
<i>Sea-Coasts and Isles of America, South Sea</i>				
Straits of Anian	57	10	251	56
Cape Blanco	42	00	245	10
Sir Francis Drake's Bay	38	16	246	30
Cape St. Lucas	23	10	266	10
Gulf of Salina	10	00	288	20
Cape de Passao	00	Xco	291	35
Truxilla	08	50	295	00
Island Ferando	33	54	292	20
Port St. Cyprian	43	51	296	38
West entrance of Magellano	53	50	296	42
Cape Horn	57	54	303	00
Honder Islands	14	50	237	30
Prince Williams Islands.	18	51	204	50
States Islands	38	50	192	00
Green Islands	04	50	172	00
Islands de Ladrões	10	00	170	00
Barbadoes Isles	07	00	195	05
Hermanes Isle	15	10	181	05

A Table of Latitude and Longitude.

	D.	M.	D.	M.
The Main of America				
Lemairs Straits	55	50	310	16
East entrance of Magellane	52	52	305	00
Cape Blanco	47	53	309	45
Cape St. Antonio	36	53	325	00
Cape St. Maria	35	50	325	40
Cape Frio	22	54	338	38
Bala de Totas Santos	13	00	341	50
Cape St. Augustine	08	54	345	40
River Cassipore	04	00	328	05
Surinam	05	05	323	40
Cape Rex	22	40	275	26
La Florida	25	51	272	16
Cape Fair	34	02	298	25
Cape Henry	37	00	300	40
Cape Cod	42	20	308	40
Cape Race	46	36	328	30
Cape Bonu Vista	49	19	328	36
The Sea-Coasts of				
The Main of America				
Bermudas	32	18	310	50
Bahama	27	57	295	20
Anguilla	18	48	313	35
St. Christopher	17	30	313	30
Antegoa	16	32	315	10
Martineco	14	30	316	36
Barbadoes	13	12	319	40
Mevis	17	00	314	00
Montserrat	16	20	314	20
East end of Hispaniola	18	47	308	10
West end of Hispaniola	18	25	300	10
Port Royal in Jamaica	18	15	297	10
East end of Cuba	20	27	301	20
West end of Cuba	22	00	288	26
Great Caiman	19	21	293	30
Islands in the West-Indies				

A Table of Latitude and Longitude.

		D.	M.	D.	M.
The Sea-Coasts of The Northern Parts of America	Cape Camas	53	40	226	52
	Resolution Isles	61	00	309	00
	Queen Anns Foreland	63	52	293	40
	Cape Charles	62	55	291	42
	Prince Ruperts River	51	00	289	12
	Cape Henrietta	56	16	279	10
	Port Nelson	58	32	267	50
	Cape Southampton	62	30	279	25
	Sea-Horse Point	64	46	282	20
	Sir Dudley Digs Cape	75	10	298	00
	Cape Walsingham	65	42	311	20
	Cape Comfort	62	21	321	20
	Cape Desolation	61	20	325	05
	Cape Farewel	59	45	329	02

The Use of the Table of Latitude and Longitude of Places.

In this Table there are two Columns, the first shewing the Latitude, the second the Longitude of Places. The Uses are,

I. To find the Latitude and Longitude of any Place.

Example.

Of the *Start* on the Coast of *England*. Against the *Start*, in the first Column, the Latitude is 50 d. 27 m. which is North, and in the second Column the Longitude is 13 d. 9 m.

Of *Cape Bona Esperanza* on the Coast of *Guiney*.

The Latitude 34 d. 24 m. South.

The Longitude 38 10 .

The Use of the Table, &c.

II. To find the Difference of Longitude between any two Places.

Take the Longitude of the two Places out of the Table, and subtract the lesser Longitude out of the greater, and if the Remainder be less than 180° deg. that is the Difference of Longitude; but if the Remainder be more than 180° deg. subtract it from 360° . the last Remainder is the Difference of Longitude.

1. Example.

To find the Difference of Longitude between the *Lizard* and *Cape Bona Esperanza*.

The Longitude of the <i>Lizard</i> is	12d. 37m.
The Longitude of <i>Cape Bona Esperanza</i>	38 10
The Difference of Longitude	<hr/> 25 33

2. Example.

To find the Difference of Longitude between the *Lizard* and the *Barbadoes*.

The Longitude of <i>Barbadoes</i>	319d. 40m.
The Longitude of the <i>Lizard</i>	12 37
The first Remainder	<hr/> 307 03
Subtracted from	360 00

The last Remainder being the Diff. of Long. 52 57

III. To know when the Difference of Longitude between any two places is Easterly or Westerly.

If the Remainder first found be less than 180° d. and you are to sail to that place which hath the greater Longitude of the two, your difference of Longitude is Easterly; but if you are to sail to that which hath the less, your difference of Longitude is Westerly.

2. If the Remainder first found be greater than 180° deg. then if you are bound to that place which hath the greater Longitude of the two, your Difference of Longitude is Westerly; if to that which hath the less, your Difference of Longitude is Easterly.

The First Year

Suns Declination, 1697, 1701, 1705, 1709.

Days.	January		Februa.		March		April		May		June	
	South.		South		South		North		North		North	
1	21	40	13	40	3	16	8	43	18	9	23	12
2	21	30	13	19	2	53	9	4	18	24	23	16
3	21	19	12	59	2	29	9	26	18	39	23	19
4	21	2	12	38	2	5	9	47	18	53	23	22
5	20	57	12	18	1	42	9	9	18	7	23	24
6	20	45	11	57	1	18	10	30	19	21	23	26
7	20	33	11	36	0	55	10	51	19	35	23	28
8	20	20	11	14	0	31	11	12	19	47	23	29
9	20	7	10	53	0	7	11	32	20	0	23	30
10	19	54	10	31	Nor. 16	11	53	20	13	23	30	
11	19	40	10	9	0	40	12	13	20	25	23	30
12	19	26	9	47	1	3	12	33	20	36	23	29
13	19	12	9	25	1	27	12	53	20	49	23	29
14	18	57	9	3	1	51	13	25	20	59	23	27
15	18	42	8	40	2	14	13	32	21	9	23	26
16	18	27	8	18	2	38	13	51	21	20	23	23
17	18	11	7	55	3	1	14	10	21	26	23	21
18	17	55	7	32	3	25	14	29	21	39	23	18
19	17	38	7	10	3	48	14	48	21	48	23	15
20	17	22	6	47	4	11	15	6	21	57	23	11
21	17	5	6	24	4	34	15	24	22	5	23	7
22	16	48	6	0	4	58	15	42	22	13	23	2
23	16	30	5	37	5	26	15	59	22	21	22	57
24	16	12	5	14	5	43	16	16	22	28	22	52
25	15	54	4	50	6	6	16	34	22	35	22	46
26	15	36	4	27	6	29	16	50	22	42	22	40
27	15	17	4	4	6	51	17	7	22	52	22	33
28	14	58	3	30	7	14	17	23	22	53	22	26
29	14	38			7	36	17	38	22	59	22	19
30	14	19			7	58	17	54	23	3	12	11
31	13	59			8	20		23	8			

after Leap-Year.

Suns Declination 1697, 1701, 1705, 1709.

Days.	July		August		Septem.		October		Novem.		Decem.	
	North		North		North		South		South		South	
1	22	31	5	4	4	14	7	24	17	45	23	9
2	21	55	14	45	3	51	7	47	18	1	23	13
3	21	46	14	37	3	28	8	9	18	17	23	17
4	21	37	14	8	3	5	8	31	18	33	23	20
5	21	27	13	49	2	42	8	54	18	48	23	23
6	21	17	13	30	2	22	9	16	19	3	23	25
7	21	8	13	11	1	55	9	38	19	17	23	27
8	20	56	12	52	1	31	10	0	19	32	23	29
9	20	45	12	32	1	8	10	21	19	47	23	29
10	20	34	12	12	0	45	10	43	19	59	23	30
11	20	22	11	52	0	21	11	4	20	12	23	30
12	20	10	11	31	Sou.	2	11	25	20	25	23	29
13	19	57	11	11	0	26	11	47	20	37	23	28
14	19	45	10	50	0	49	12	7	20	49	23	27
15	19	32	10	29	1	13	12	28	20	1	23	25
16	19	18	10	8	1	36	12	49	21	12	23	23
17	19	5	9	47	1	59	13	9	21	23	23	19
18	18	50	9	26	2	23	13	29	21	33	23	17
19	18	36	9	4	2	46	3	49	21	43	23	13
20	18	21	8	43	3	10	14	9	21	53	23	8
21	18	7	8	21	3	34	14	28	22	2	23	4
22	17	51	7	59	3	56	14	47	22	10	22	59
23	17	36	7	37	4	20	15	7	22	19	22	53
24	17	20	7	15	4	43	15	25	22	26	22	47
25	17	4	6	53	5	6	15	43	22	34	22	40
26	16	48	6	31	5	29	16	2	22	41	22	33
27	16	31	6	8	5	52	16	20	22	47	22	26
28	16	14	5	45	6	16	16	38	22	53	22	18
29	15	57	5	22	6	38	16	55	22	59	22	10
30	15	39	5	0	7	1	17	12	23	4	22	1
31	15	22	4	37			17	29		21	22	52

The Second Year

Suns Declination, 1698, 1702, 1706, 1710.

Days.	January		Februa.		March		April		May		June	
	South.		South		South		North		North		North	
1	21	42	13	49	3	22	8	38	18	6	23	11
2	21	32	13	24	3	59	8	59	18	19	23	15
3	21	22	13	4	2	31	9	21	18	35	23	18
4	21	11	12	43	2	11	9	42	18	50	23	21
5	21	00	12	23	1	48	10	04	19	04	23	24
6	20	48	12	2	1	24	10	25	19	18	23	26
7	20	30	11	41	1	0	10	46	19	31	23	27
8	20	23	11	19	0	37	11	7	19	45	23	29
9	20	10	10	58	0	13	11	28	19	57	23	29
10	19	58	10	36	Nor. 11		11	48	20	10	23	30
11	19	44	10	15	0	34	12	8	20	23	23	30
12	19	30	9	53	0	58	12	28	20	34	23	30
13	19	16	9	30	1	21	12	48	20	45	23	29
14	19	1	9	8	1	45	13	8	20	56	23	29
15	18	46	8	46	2	9	13	27	21	7	23	27
16	18	31	8	23	2	32	13	47	21	17	23	24
17	18	15	8	1	2	55	14	6	21	27	23	21
18	17	59	7	38	3	19	14	25	21	38	23	19
19	17	43	7	15	3	42	14	43	21	46	23	15
20	17	26	6	52	4	05	14	58	21	55	23	12
21	17	9	6	29	4	29	15	20	22	3	23	8
22	16	52	6	6	4	42	15	37	22	11	23	3
23	16	34	5	43	5	15	15	55	22	19	22	58
24	16	16	5	21	5	38	16	12	22	27	22	53
25	15	58	4	56	6	0	16	29	22	33	22	47
26	15	40	4	33	6	23	16	46	22	40	22	41
27	15	21	4	9	6	46	17	3	22	46	22	35
28	15	2	3	46	7	9	17	19	22	52	22	28
29	14	43			7	31	17	35	22	57	22	21
30	14	24			7	53	17	50	23	2	22	13
31	14	4			8	15		23		7		

after Leap Year.

Suns Declination 1698, 1702, 1706, 1710.

Days	July		August		Septem.		October		Novem.		Decem.	
	North		North		North		South		South		South	
1	22	5	15	8	4	19	7	18	17	41	23	8
2	21	58	14	50	3	57	7	41	17	57	23	12
3	21	48	14	32	3	33	8	4	18	13	23	16
4	21	39	14	13	3	10	8	26	18	29	23	19
5	21	29	13	54	2	47	8	48	18	44	23	22
6	21	19	13	35	2	24	9	10	18	59	23	25
7	21	9	13	16	2	1	9	33	19	14	23	27
8	20	59	12	56	1	37	9	54	19	26	23	28
9	20	48	12	37	1	13	10	16	19	42	23	29
10	20	36	12	17	0	50	10	38	19	56	23	30
11	20	25	11	57	0	27	10	59	20	9	23	30
12	20	13	11	36	0	4	11	20	20	20	23	30
13	20	0	11	16	Sou. 20		11	42	20	34	23	29
14	19	47	10	55	0	43	12	3	20	46	23	27
15	19	34	10	34	1	7	12	23	20	58	23	26
16	19	21	10	13	1	30	12	44	21	9	23	23
17	19	7	9	52	1	54	13	4	21	20	23	21
18	18	53	9	31	2	17	13	24	21	31	23	17
19	18	39	9	10	2	41	13	41	21	41	23	14
20	18	24	8	48	3	4	4	4	21	50	23	10
21	18	9	8	26	3	27	14	24	21	59	23	7
22	17	54	8	5	3	51	14	42	22	8	23	0
23	17	39	7	43	4	14	15	2	22	17	22	54
24	17	23	7	20	4	38	15	20	22	25	22	48
25	17	7	6	58	5	0	15	39	22	32	22	42
26	16	5	6	36	5	24	15	58	22	39	22	34
27	16	35	6	13	5	47	16	15	22	46	22	28
28	16	18	5	51	6	20	16	33	22	52	22	20
29	16	1	5	28	6	33	16	5	22	57	22	13
30	15	43	5	8	6	56	17	5	23	3	22	3
31	15	26	4	46			17	2		21		54

The Third Year

Suns Declination 1699, 1703, 1707, 1711.

Days	January		February		March		April		May		June	
	South	h	South		South		North		North		North	
1	21	45	13	50	3	29	8	30	18	1	23	10
2	21	35	13	29	3	4	8	54	18	17	23	14
3	21	24	13	9	2	41	9	16	18	32	23	17
4	21	13	12	48	2	17	9	37	18	46	23	21
5	21	2	12	28	1	54	9	59	19		23	23
6	20	51	12	6	1	30	10	20	19	14	23	25
7	20	40	11	46	1	6	10	41	19	28	23	27
8	20	26	11	25	0	42	11	2	19	41	23	28
9	20	14	11	3	0	19	11	23	19	54	23	29
10	20	1	10	42	Nor.	4	11	42	20	8	23	30
11	19	47	10	20	0	28	12	3	20	20	23	30
12	19	33	9	58	0	52	12	23	20	31	23	30
13	19	19	9	36	1	16	12	48	20	42	23	29
14	19	5	9	14	1	48	13	3	20	53	23	28
15	18	50	8	51	2	3	13	22	21	4	23	26
16	18	34	8	28	2	27	13	42	21	15	23	24
17	18	19	8	6	2	50	14	1	21	25	23	22
18	18	3	7	43	3	13	14	20	21	35	23	19
19	17	47	7	21	3	37	14	39	21	44	23	16
20	17	30	6	58	4	0	14	57	21	53	23	13
21	17	13	6	35	4	23	15	15	22	3	23	9
22	16	56	6	12	4	46	15	33	22	10	23	4
23	16	38	5	49	5	9	15	51	22	17	23	0
24	16	21	5	25	5	32	16	8	22	25	22	54
25	16	3	5	2	5	55	16	25	22	32	22	49
26	15	44	4	39	6	18	16	42	22	39	22	43
27	15	26	4	15	6	41	16	59	22	45	22	36
28	15	7	3	52	7	3	17	15	22	51	22	30
29	14	48			7	25	17	31	22	56	22	23
30	14	28			7	48	17	47	23	1	22	15
31	14	9			8	10			23	6		

after Leap Year.

Suns Declination 1699, 1703, 1707, 1711.

Days	July		August		Septem.		October		Novem.		Decem.	
	North		North		North		South		South		South	
1	22	7	15	13	4	26	7	11	17	36	23	6
2	21	59	14	54	4	3	7	35	17	54	23	11
3	21	50	14	36	3	39	7	58	18	9	23	15
4	21	41	14	18	3	16	8	20	18	25	23	18
5	21	32	13	50	2	53	8	43	18	41	23	22
6	21	22	13	40	2	29	9	5	18	56	23	24
7	21	12	13	21	2	6	9	27	19	10	23	26
8	21	1	13	1	1	43	9	40	19	25	23	28
9	20	50	12	41	1	19	10	11	19	39	23	29
10	20	39	12	22	0	56	10	38	19	52	23	30
11	20	28	12	2	0	33	10	54	20	6	23	30
12	20	16	11	41	0	9	11	15	20	19	23	30
13	20	6	11	21	Sou. 14		11	36	20	31	23	29
14	19	53	11	0	0	37	11	57	20	43	23	27
15	19	38	10	59	1	1	12	18	20	55	23	26
16	19	25	10	19	1	24	12	39	21	6	23	24
17	19	11	9	57	1	48	12	59	21	16	23	21
18	18	57	9	36	2	11	13	20	21	28	23	18
19	18	43	9	15	2	35	13	40	21	38	23	15
20	18	29	8	53	2	58	13	50	21	48	23	11
21	18	14	8	32	3	21	14	19	21	57	23	6
22	17	59	8	10	3	45	14	38	22	6	23	1
23	17	43	7	48	4	8	14	59	22	15	22	57
24	17	28	7	26	4	32	15	17	22	23	22	50
25	17	12	6	59	4	55	15	35	22	30	22	44
26	16	55	6	41	5	22	15	53	22	37	22	37
27	16	39	6	19	5	41	16	11	22	44	22	30
28	16	22	5	56	6	4	16	25	22	50	22	22
29	16	5	5	33	6	27	16	46	22	56	22	14
30	15	50	5	11	6	51	17	4	23	2	22	5
31	15	30	4	48			17	20		21	21	56

Leap Year.

Suns Declination 1700, 1704, 1708, 1712.

Days	January		February		March		April		May		June	
	South		South		South		North		North		North	
1	21	47	13	54	2	57	8	48	18	24	23	01
2	21	37	13	34	2	45	9	10	18	28	23	17
3	21	28	13	14	2	23	9	32	18	43	23	20
4	21	16	12	53	1	59	9	53	18	57	23	22
5	21	7	12	23	1	35	10	15	19	11	23	25
6	20	54	12	12	1	12	10	36	19	25	23	27
7	20	42	11	51	0	48	10	57	19	38	23	28
8	20	30	11	26	0	24	11	17	19	51	23	29
9	20	17	11	9	0	1	11	38	20	4	23	30
10	20	4	10	47	Nor.	22	11	58	20	16	23	30
11	19	50	10	25	0	46	12	18	20	28	23	30
12	19	37	10	3	1	10	12	39	20	39	23	29
13	19	23	9	41	1	34	12	58	20	51	23	28
14	19	8	9	19	1	54	13	18	21	2	23	27
15	18	53	8	57	2	21	13	37	21	12	23	25
16	18	38	8	34	2	44	13	56	21	22	23	23
17	18	22	8	12	3	8	14	16	21	32	23	20
18	18	7	7	49	3	31	14	34	21	44	23	17
19	17	51	7	26	3	54	14	53	21	50	23	14
20	17	34	7	4	4	18	15	11	21	59	23	10
21	17	17	6	41	4	41	15	29	22	8	23	5
22	17	0	6	17	5	6	15	47	22	16	23	1
23	16	43	5	54	5	27	16	4	22	23	22	56
24	16	25	5	31	5	50	16	21	22	30	22	50
25	16	7	5	8	6	12	16	36	22	37	22	44
26	15	49	4	44	6	35	16	54	22	43	22	38
27	15	30	4	21	6	5	17	11	22	46	22	31
28	15	11	3	57	7	20	17	27	22	55	22	24
29	14	53	3	34	7	42	17	43	23	0	22	17
30	14	33			8	4	17	58	23	5	22	9
31	14	14			8	26			23	9		

Leap Year.

Suns Declination 1700, 1704, 1708, 1712.

Days.	July		August		Septem.		October		Novem.		Decem.	
	North		North		North		South		South		South	
1	22	46	14	59	4	19	7	30	17	49	23	10
2	21	52	14	41	3	45	7	53	18	6	23	14
3	21	43	14	25	3	22	8	15	18	21	23	18
4	21	34	14	4	3	58	8	37	18	37	23	21
5	21	24	13	44	2	35	9	0	18	52	23	24
6	21	14	13	25	2	12	9	22	19	7	23	26
7	21	4	13	6	1	48	9	44	19	21	23	28
8	20	53	12	46	1	25	10	5	19	36	23	29
9	20	42	12	26	1	2	10	27	19	49	23	30
10	20	30	12	6	0	41	10	49	20	2	23	30
11	20	19	11	46	0	15	11	10	20	15	23	30
12	20	7	11	26	Sou. 8		11	31	20	28	23	20
13	19	54	11	6	0	32	11	52	20	40	23	28
14	19	41	10	45	0	55	12	13	20	52	23	27
15	19	28	10	24	1	19	12	24	21	4	23	25
16	19	14	10	3	1	42	12	54	21	15	23	22
17	19	1	9	41	2	6	13	15	21	25	23	19
18	18	46	9	20	2	29	13	35	21	36	23	16
19	18	32	8	59	2	53	13	54	21	46	23	12
20	18	17	8	37	3	16	14	14	21	55	23	7
21	18	2	8	15	3	39	14	34	22	4	23	2
22	17	44	7	53	4	3	14	53	22	13	22	57
23	17	31	7	31	4	26	15	11	22	21	22	51
24	17	16	7	9	4	49	15	31	22	28	22	45
25	16	59	6	47	5	13	15	49	22	36	22	39
26	16	43	6	24	5	36	16	7	22	43	22	31
27	16	26	6	2	5	59	16	25	22	49	22	24
28	16	9	5	39	6	22	16	42	22	55	22	16
29	15	52	5	16	6	44	17	0	23	0	22	7
30	15	34	4	54	7	8	17	16	23	5	21	59
31	15	17	4	32			17	33			21	49

The Use of the Table, &c.

The Use of the Table of the Suns Declination.

THese Tables shew the Suns Declination at noon, for the years 1697, 1698, &c. to 1712 and these years are distinguished in the Title of the Table, into the first, the second, third, and the Leap-year.

In every Page of this Table there are seven Columns, in the first are the days of the Month, and in the other six the Months of the year. The Declination is distinguished by the Title of North and South at the head of the Table, and likewise against 10th. of March is (Nor.) for North, and against the 12th., or 13th. of September is (Sou.) for South Declination, because about the 10th of March the Declination is changed from South to North, and about the 12th or 13th of September from North to South.

EXAMPLE.

To find the Suns Declination May 10. at Noon, 1697.

Turn over the Table till you find the year 1697, which you will find to be the first after Leap-year, and against the 10th day and under the Month of May, you will find the Declination to be 20 d. 13 m. North.

To find the Suns Declination Octob. 22. at Noon, 1700:

Turn over the Table till you find the year 1700, which you will find to be Leap-year, and against the 22th day, and under the Month October, you will find the Suns Declination to be 14 d. 53 m. South.

Note that in the Leap-Year February hath 29 days.

The Bearing, Distance and Longest Day of most of the Principal Cities and Places in the World, from the Famous City of **L O N D O N**.

Names of the Places.	Point of Bearing.	Dist. miles	Length of Day.	
			H.	M.
<i>Alexandria in Egypt</i>	S. E. by E.	2160	14	00
<i>Amsterdam in Holland</i>	E. by N.	266	16	40
<i>Antwerp in Brabant</i>	East ferè	248	16	28
<i>Babylon</i>	E. S. E.	2724	14	25
<i>Barwick</i>	North ferè	267	17	24
<i>Calice in France</i>	E. by S.	86	16	25
<i>Calicut in East-India</i>	S. E. by E.	5214	12	20
<i>Constantinople</i>	E. S. E.	1547	15	15
<i>Dantzick</i>	E. N. E.	961	17	05
<i>Dublin in Ireland</i>	N W. by W.	296	17	15
<i>Edinburgh in Scotland</i>	North	327	17	40
<i>Florence</i>	South-East	800	15	10
<i>Frank ford</i>	East ferè	448	16	15
<i>Hamburg</i>	E. N. E.	538	18	00
<i>Jerusalem</i>	S. E. by E.	2352	14	08
<i>Iceland</i>	N. N. W.	930	21	44
<i>Lisbon in Portugal</i>	S. S. W.	985	14	45
<i>Mentz in Germany</i>	East	410	16	25
<i>Mexico</i>	W. by S.	6844	13	20
<i>Middleburg in Zealand</i>	East	205	16	30
<i>Morocco in Barbary</i>	S. S. W.	1449	14	00
<i>Naples</i>	S. E. by E.	1051	14	50
<i>Paris in France</i>	S. S. E.	215	15	57
<i>Prague in Bohemia</i>	East ferè	700	16	15
<i>Quinzai in China</i>	E. by S.	1272	13	35
<i>Rome</i>	S. E. by E.	887	15	04
<i>Sevil</i>	S. by W.	950	14	40
<i>Spiers</i>	East by S.	430	16	02
<i>Toledo in Spain</i>	S. by W.	934	14	36
<i>Troy</i>	E. S. E.	1605	15	00
<i>Venice</i>	E. S. E.	744	13	28
<i>Tork</i>	North ferè	150	17	00
L O N D O N.			16	26

A Table of Diff. of Latitude and Departure.

Distance.	$\frac{1}{4}$ Point.					$\frac{1}{2}$ Point.					$\frac{3}{4}$ Point.					1 Point.				Distance.			
	Lat.		Dep.			Lat.		Dep.			Lat.		Dep.			Lat.		Dep.					
1	1	0	0	0		1	0	0	1		1	0	0	1		1	0	0	2	1			
2	2	0	0	1		2	0	0	2		2	0	0	3		2	0	0	4	2			
3	3	0	0	1		3	0	0	3		3	0	0	4		2	9	0	6	3			
4	4	0	0	2		4	0	0	4		4	0	0	6		3	9	0	8	4			
5	5	0	0	2		5	0	0	5		5	0	0	7		4	9	1	0	5			
6	6	0	0	3		6	0	0	6		5	9	0	8		5	9	1	2	6			
7	7	0	0	3		7	0	0	7		5	9	1	0		6	9	1	4	7			
8	8	0	0	4		8	0	0	8		7	9	1	2		7	8	1	6	8			
9	9	0	0	4		9	0	0	9		8	9	1	3		8	8	1	8	9			
10	10	0	0	5		10	0	1	0		9	9	1	5		9	8	2	0	10			
11	11	0	0	5		10	9	1	1		10	9	1	6		10	8	2	1	11			
12	12	0	0	6		11	9	1	2		11	9	1	8		11	8	2	3	12			
13	13	0	0	6		12	9	1	3		12	9	1	9		12	8	2	5	13			
14	14	0	0	7		13	9	1	4		13	9	2	0		13	7	2	7	14			
15	15	0	0	7		14	9	1	5		14	9	2	2		14	7	2	9	15			
16	16	0	0	8		15	9	1	6		15	9	2	3		15	7	3	1	16			
17	17	0	0	8		16	9	1	7		16	9	2	5		16	7	3	3	17			
18	18	0	0	9		17	9	1	8		17	8	2	6		17	7	3	5	18			
19	19	0	0	9		18	9	1	9		18	8	2	8		18	6	3	7	19			
20	20	0	1	0		19	9	2	0		19	8	2	9		19	6	3	9	20			
21	21	0	1	0		20	9	2	1		20	8	3	1		20	6	4	1	21			
22	22	0	1	1		21	9	2	2		21	8	3	2		21	6	4	3	22			
23	23	0	1	1		22	9	2	3		22	8	3	4		22	6	4	5	23			
24	24	0	1	2		23	9	2	4		23	8	3	5		23	6	4	7	24			
25	25	0	1	2		24	9	2	5		24	8	3	7		24	5	4	9	25			
26	26	0	1	3		25	9	2	6		25	7	3	8		25	5	5	1	26			
27	27	0	1	3		26	9	2	7		26	7	4	0		26	5	5	3	27			
28	28	0	1	4		27	9	2	8		27	7	4	1		27	5	5	5	28			
29	29	0	1	4		28	9	2	9		28	7	4	3		28	4	5	7	29			
30	30	0	1	5		29	9	2	9		29	7	4	4		29	4	5	8	30			
		Dep.		Lat.				Dep.		Lat.				Dep.		Lat.				Dep.		Lat.	
		$7\frac{1}{4}$ Point.						$7\frac{1}{2}$ Point.						$7\frac{3}{4}$ Point.						7 Point.			

A Table of Diff. of Latitude and Departure.

A Table of Diff. of Latitude and Departure.																	
Distance.	$\frac{1}{4}$ Point.				$\frac{1}{2}$ Point.				$\frac{3}{4}$ Point.				1 Point.				Distance.
	Lat.		Dep.		Lat.		Dep.		Lat.		Dep.		Lat.		Dep.		
31	31	0	1	5	30	8	3	0	30	7	4	6	30	4	6	0	31
32	32	0	1	6	31	8	3	1	31	7	4	7	31	4	6	2	32
33	33	0	1	6	32	8	3	2	32	7	4	9	32	4	6	4	33
34	34	0	1	7	33	8	3	3	33	7	5	0	33	3	6	6	34
35	35	0	1	7	34	8	3	4	34	6	5	2	34	3	6	8	35
36	36	0	1	8	35	8	3	5	35	6	5	3	35	3	7	0	36
37	37	0	1	8	36	8	3	6	36	6	5	5	36	3	7	2	37
38	38	0	1	9	37	8	3	7	37	6	5	6	37	3	7	4	38
39	39	0	1	9	38	8	3	8	38	6	5	8	38	3	7	6	39
40	40	0	2	0	39	8	3	9	39	6	5	9	39	2	7	8	40
41	40	9	2	0	40	8	4	0	40	6	6	1	40	2	8	0	41
42	41	9	2	1	41	8	4	1	41	6	6	2	41	2	8	2	42
43	42	9	2	1	42	8	4	2	42	5	6	4	42	2	8	4	43
44	43	9	2	2	43	8	4	3	43	5	6	5	43	2	8	6	44
45	44	9	2	2	44	8	4	4	44	5	6	7	44	1	8	8	45
46	45	9	2	3	45	8	4	5	45	5	6	8	45	1	9	0	46
47	46	9	2	3	46	8	4	6	46	5	7	0	46	1	9	2	47
48	47	9	2	4	47	8	4	7	47	5	7	1	47	1	9	4	48
49	48	9	2	4	48	8	4	8	48	5	7	2	48	1	9	6	49
50	49	9	2	5	49	8	4	9	49	5	7	3	49	0	9	8	50
51	50	9	2	5	50	7	5	0	50	4	7	5	50	0	9	5	51
52	51	9	2	5	51	7	5	1	51	4	7	6	51	0	10	1	52
53	52	9	2	6	52	7	5	2	52	4	7	8	52	0	10	3	53
54	53	9	2	6	53	7	5	3	53	4	7	5	53	0	10	5	54
55	54	9	2	7	54	7	5	4	54	4	8	1	53	9	10	7	55
56	55	9	2	7	55	7	5	5	55	4	8	2	54	9	10	9	56
57	56	9	2	8	56	7	5	6	56	4	8	4	55	9	11	1	57
58	57	9	2	8	57	7	5	7	57	4	8	5	56	9	11	3	58
59	58	9	2	9	58	7	5	8	58	3	8	6	57	9	11	5	59
60	59	9	2	9	59	7	5	9	59	3	8	8	58	8	11	7	60
	Dep.		Lat.		Dep.		Lat.		Dep.		Lat.		Dep.		Lat.		
	$7\frac{1}{4}$ Point.				$7\frac{1}{2}$ Point.				$7\frac{3}{4}$ Point.				7 Points.				

A Table of Diff. of Latitude and Departure.																	
Distance	1 $\frac{1}{4}$ Point.			Distance	1 $\frac{1}{2}$ Point.			Distance	1 $\frac{3}{4}$ Point.			Distance	2 Points.				
	Lat.	Dep.			Lat.	Dep.			Lat.	Dep.			Lat.	Dep.			
1	1	0	0	2	1	0	0	2	0	9	0	3	0	9	0	4	1
2	1	9	0	5	1	9	0	6	1	9	0	7	1	8	0	8	2
3	2	9	0	7	2	9	0	9	2	8	1	0	2	8	1	1	3
4	3	9	1	0	3	8	1	2	3	8	1	3	3	7	1	5	4
5	4	8	1	2	4	8	1	5	4	7	1	7	4	6	1	9	5
6	5	8	1	4	5	7	1	7	5	6	2	0	5	5	2	3	6
7	5	8	1	7	6	7	2	0	6	6	2	4	6	5	2	7	7
8	7	8	1	9	7	6	2	3	7	6	2	7	7	4	3	1	8
9	8	7	2	2	8	6	2	6	8	5	3	0	8	3	3	4	9
10	9	7	2	4	9	6	2	9	9	4	3	4	9	2	3	8	10
11	10	7	2	7	10	5	3	2	10	3	3	7	10	2	4	2	11
12	11	6	2	9	11	5	3	5	11	3	4	0	11	1	4	6	12
13	12	6	3	1	12	4	3	8	12	2	4	4	12	0	5	0	13
14	13	6	3	4	13	4	4	1	13	2	4	8	13	0	5	4	14
15	14	6	3	6	14	3	4	4	14	1	5	1	13	9	5	8	15
16	15	5	3	9	15	3	4	7	15	0	5	4	14	8	6	1	16
17	16	5	4	1	16	2	5	0	16	0	5	7	15	7	6	5	17
18	17	5	4	4	17	2	5	2	16	9	6	0	16	7	6	9	18
19	18	4	4	6	18	2	5	5	17	9	6	4	17	6	7	2	19
20	19	4	4	8	19	1	5	8	18	8	6	7	18	5	7	6	20
21	20	4	5	0	20	1	6	1	19	7	7	0	19	5	8	0	21
22	21	3	5	3	21	0	6	4	20	7	7	4	20	4	8	4	22
23	22	3	5	6	22	0	6	7	21	6	7	7	21	3	8	8	23
24	23	3	5	8	23	0	7	0	22	6	8	0	22	2	9	1	24
25	24	2	5	0	23	9	7	3	23	5	8	4	23	1	9	5	25
26	25	2	6	3	24	9	7	6	24	4	8	7	24	0	9	9	26
27	26	2	6	5	25	8	7	9	25	4	9	0	25	0	10	3	27
28	27	2	6	8	26	8	8	2	26	3	9	4	25	9	10	7	28
29	28	1	7	0	27	7	8	5	27	2	9	7	26	8	11	1	29
30	29	1	7	3	28	7	8	7	28	2	10	1	27	7	11	5	30
Dep. Lat.				Dep. Lat.				Dep. Lat.				Dep. Lat.					
6 $\frac{1}{4}$ Point.				6 $\frac{1}{2}$ Point.				6 $\frac{3}{4}$ Point.				6 Points.					

A Table of Diff. of Latitude and Departure.

Distance.	1 $\frac{1}{4}$ Point.		1 $\frac{1}{2}$ Point.		1 $\frac{3}{4}$ Point.		2 Points.		Distance.
	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	
31	30 17 5		29 6 9 0		29 1 10 4		28 6 11 9		31
32	31 0 7 7		30 6 9 2		30 1 10 8		29 5 12 3		32
33	32 0 8 0		31 6 9 5		31 0 11 1		30 5 12 7		33
34	33 0 8 2		32 5 9 8		31 9 11 4		31 4 13 1		34
35	34 0 8 5		33 5 10 1		32 9 11 8		32 3 13 5		35
36	34 9 8 7		34 4 10 4		33 8 12 1		33 2 13 8		36
37	35 9 9 0		35 4 10 7		34 8 12 4		34 1 14 2		37
38	36 9 9 2		36 3 11 0		35 7 12 8		35 0 14 6		38
39	37 8 9 4		37 3 11 3		36 7 13 1		36 0 15 0		39
40	38 8 9 7		38 3 11 6		37 7 13 5		36 9 15 3		40
41	39 8 9 9		39 2 11 9		38 6 13 8		37 8 15 7		41
42	40 7 10 2		40 2 12 2		39 0 14 1		38 7 16 1		42
43	41 7 10 4		41 1 12 5		40 5 14 5		39 6 16 5		43
44	42 7 10 7		42 1 12 8		41 4 14 8		40 6 16 9		44
45	43 7 10 9		43 0 13 0		42 4 15 1		41 5 17 2		45
46	44 6 11 1		44 0 13 3		43 3 15 5		42 4 17 6		46
47	45 6 11 4		44 9 13 6		44 3 15 8		43 4 18 0		47
48	46 6 11 6		45 9 13 9		45 2 16 1		44 3 18 4		48
49	47 5 11 9		46 9 14 2		46 2 16 5		45 2 18 8		49
50	48 5 12 1		47 8 14 5		47 1 16 8		46 2 19 1		50
51	49 5 12 3		48 8 14 8		48 0 17 1		47 1 19 5		51
52	50 4 12 6		49 7 15 1		49 0 17 5		48 0 19 9		52
53	51 4 12 8		50 7 15 4		49 9 17 9		49 0 20 2		53
54	52 4 13 1		51 6 15 7		50 8 18 2		49 9 20 6		54
55	53 4 13 3		52 6 16 0		51 8 18 5		50 8 21 0		55
56	54 3 13 6		53 5 16 3		52 7 18 9		51 8 21 4		56
57	55 3 13 8		54 5 16 6		53 7 19 2		52 7 21 8		57
58	56 3 13 0		55 4 16 9		54 6 19 5		53 6 22 2		58
59	57 2 14 3		56 4 17 1		55 6 19 9		54 5 22 6		59
60	58 2 14 5		57 4 17 4		56 5 20 2		55 4 23 0		60
	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	
	1 $\frac{1}{4}$ Point.		1 $\frac{1}{2}$ Point.		1 $\frac{3}{4}$ Point.		2 Points.		

A Table of Diff. of Latitude and Departure.															
Distance.	$2\frac{1}{4}$ Point.				$2\frac{1}{2}$ Point.				$2\frac{3}{4}$ Point.				Distance.		
	Lat.		Dep.		Lat.		Dep.		Lat.		Dep.				
1	0	9	0	4	0	9	0	5	0	9	0	5	1		
2	1	8	0	9	1	8	0	9	1	7	1	0	2		
3	2	7	1	3	2	6	1	4	2	6	1	5	3		
4	3	6	1	7	3	5	1	9	3	4	2	1	4		
5	4	5	2	1	4	4	2	4	4	3	2	6	5		
6	5	4	2	6	5	3	2	8	5	1	3	1	6		
7	5	3	3	0	6	2	3	3	6	0	3	6	7		
8	7	2	3	4	7	0	3	8	6	9	4	1	8		
9	8	1	3	8	7	9	4	2	7	7	4	6	9		
10	9	0	4	3	8	8	4	7	8	6	5	1	10		
11	9	9	4	7	9	7	5	2	9	4	5	6	11		
12	10	8	5	1	10	6	5	6	10	3	6	2	12		
13	11	7	5	6	11	5	6	1	11	1	6	7	13		
14	12	6	6	0	12	4	6	5	12	0	7	2	14		
15	13	5	6	4	13	2	7	0	12	9	7	7	15		
16	14	5	6	9	14	1	7	5	13	7	8	2	16		
17	15	4	7	3	15	0	7	9	14	6	8	7	17		
18	16	3	7	7	15	9	8	4	15	4	9	2	18		
19	17	2	8	1	16	8	8	9	16	3	9	7	19		
20	18	1	8	6	17	6	9	4	17	1	10	3	20		
21	19	0	9	0	18	5	9	8	18	0	10	8	21		
22	19	9	9	4	19	4	10	3	18	9	11	3	22		
23	20	8	9	8	20	3	10	8	19	7	11	8	23		
24	21	7	10	3	21	2	11	2	20	6	12	3	24		
25	22	6	10	7	22	1	11	7	21	4	12	8	25		
26	23	5	11	1	23	0	12	2	22	3	13	3	26		
27	24	4	11	6	23	8	12	6	23	1	13	8	27		
28	25	3	12	0	24	7	13	1	24	0	14	3	28		
29	26	2	12	4	25	6	13	6	24	9	14	8	29		
30	27	1	12	8	26	5	14	1	25	7	15	4	30		
Dep.		Lat.		Dep.		Lat.		Dep.		Lat.		Dep.		Lat.	
$5\frac{1}{4}$ Point.				$5\frac{1}{2}$ Point.				$5\frac{3}{4}$ Point.				5 Points.			

A Table of Diff. of Latitude and Departure.											Distance.		
Distance.	2 $\frac{1}{4}$ Point.			2 $\frac{1}{2}$ Point.			2 $\frac{3}{4}$ Point.			3 Points.			Distance.
	Lat.	Dep.		Lat.	Dep.		Lat.	Dep.		Lat.	Dep.		
31	28 0	13 3		27 4	14 5		26 6	15 9		25 7	17 2		31
32	28 9	13 7		28 2	15 0		27 4	16 4		26 5	17 8		32
33	29 8	14 1		29 1	15 5		28 3	16 9		27 3	18 3		33
34	30 7	14 6		30 0	15 9		29 1	17 4		28 2	18 9		34
35	31 6	15 0		30 9	16 4		30 0	17 9		29 1	19 4		35
36	32 5	15 4		31 8	16 9		30 9	18 5		29 9	20 0		36
37	33 4	15 8		32 6	17 4		31 7	19 0		30 8	20 6		37
38	34 3	16 3		33 5	17 9		32 6	19 5		31 6	21 1		38
39	35 2	16 7		34 4	18 4		33 4	20 1		32 4	21 7		39
40	36 1	17 1		35 3	18 9		34 3	20 6		33 3	22 2		40
41	37 0	17 6		36 2	19 3		35 1	21 1		34 1	22 8		41
42	37 9	18 0		37 1	19 8		36 0	21 6		34 9	23 3		42
43	38 8	18 4		38 0	20 3		36 9	22 1		35 8	23 9		43
44	39 7	18 9		38 8	20 8		37 7	22 6		36 6	24 4		44
45	40 6	19 3		39 7	21 2		38 6	23 1		37 4	25 0		45
46	41 6	19 7		40 6	21 7		39 4	23 6		38 3	25 6		46
47	42 5	20 1		41 5	22 2		40 3	24 2		39 1	26 1		47
48	43 4	20 6		42 4	22 7		41 1	24 7		39 9	26 7		48
49	44 3	21 0		43 2	23 2		42 0	25 2		40 8	27 2		49
50	45 2	21 4		44 1	23 6		42 9	25 7		41 6	27 8		50
51	46 1	21 8		45 0	24 1		43 7	26 2		42 4	28 3		51
52	47 0	22 3		45 9	24 5		44 6	26 7		43 3	28 9		52
53	47 9	22 7		46 8	24 9		45 4	27 2		44 1	29 4		53
54	48 8	23 1		47 7	25 4		46 3	27 7		44 9	30 0		54
55	49 7	23 6		48 5	25 9		47 1	28 3		45 7	30 6		55
56	50 6	24 0		49 4	26 4		48 0	28 8		46 6	31 1		56
57	51 5	24 4		50 3	26 8		48 9	29 3		47 4	31 7		57
58	52 4	24 8		51 2	27 3		49 7	29 8		48 3	32 2		58
59	53 3	25 2		52 0	27 8		50 6	30 3		49 1	32 8		59
60	54 2	25 6		52 9	28 3		51 5	30 8		49 9	33 3		60
	Dep. Lat.			Dep. Lat.			Dep. Lat.			Dep. Lat.			
	5 $\frac{1}{4}$ Point.			5 $\frac{1}{2}$ Point.			5 $\frac{3}{4}$ Point.			5 Point.			

A Table of Diff. of Latitude and Departure.

A Table of Diff. of Latitude and Departure.																			
Distance.	3 $\frac{1}{4}$ Point.				3 $\frac{1}{2}$ Point.				3 $\frac{3}{4}$ Point.				4 Points.				Distance.		
	Lat.		Dep.		Lat.		Dep.		Lat.		Dep.		Lat.		Dep.				
1	0	8	0	6	0	8	0	6	0	7	0	7	0	7	0	7	1		
2	1	6	1	2	1	6	1	3	1	5	1	3	1	4	1	4	2		
3	2	4	1	8	2	3	1	9	2	2	2	C	2	1	2	1	3		
4	3	2	2	4	3	1	2	5	3	0	2	7	2	8	2	8	4		
5	4	0	3	0	3	5	3	2	3	7	3	4	3	5	3	5	5		
6	4	8	3	6	4	6	3	8	4	4	4	C	4	2	4	2	6		
7	5	6	4	2	5	4	4	4	5	2	4	7	4	9	4	9	7		
8	6	4	4	8	6	2	5	1	5	9	5	4	5	7	5	7	8		
9	7	2	5	4	7	0	5	7	6	7	6	C	5	4	6	4	9		
10	8	0	6	C	7	7	5	3	7	4	5	7	7	1	7	1	10		
11	8	8	6	6	8	5	6	5	8	1	7	4	7	8	7	8	11		
12	9	6	7	2	9	2	7	5	8	9	8	C	3	5	3	5	12		
13	10	4	7	8	10	0	8	2	9	6	8	7	9	2	9	2	13		
14	11	2	8	4	10	8	8	8	10	4	9	4	9	9	9	9	14		
15	12	0	9	C	11	6	9	4	11	1	10	C	10	6	10	6	15		
16	12	8	9	6	12	4	10	1	11	5	10	7	11	3	11	3	16		
17	13	6	10	2	13	2	10	7	12	6	11	4	12	C	12	0	17		
18	14	4	10	8	14	0	11	3	13	4	12	C	12	7	12	7	18		
19	15	2	11	4	14	7	12	C	14	1	12	7	13	4	13	4	19		
20	16	1	11	5	15	5	12	7	14	8	13	4	14	1	14	1	20		
21	16	9	12	5	16	3	13	3	15	6	14	1	14	8	14	8	21		
22	17	7	13	1	17	1	13	9	16	3	14	8	15	6	15	6	22		
23	18	5	13	7	17	9	14	6	17	1	15	5	16	3	16	3	23		
24	19	3	14	3	18	6	15	3	17	8	16	1	17	C	17	0	24		
25	20	1	14	9	19	4	15	9	18	6	16	8	17	7	17	7	25		
26	20	9	15	5	20	2	16	6	19	3	17	5	18	4	18	4	26		
27	21	7	16	1	21	0	17	2	20	1	18	1	19	1	19	1	27		
28	22	5	16	7	21	7	17	8	20	7	18	8	19	8	19	8	28		
29	23	3	17	3	22	5	18	4	21	5	19	5	20	5	20	5	29		
30	24	1	17	9	23	3	19	C	22	2	20	1	21	2	21	2	30		
Dep.		Lat.		Dep.		Lat.		Dep.		Lat.		Dep.		Lat.					
4 $\frac{1}{4}$ Point.				4 $\frac{1}{2}$ Point.				4 $\frac{3}{4}$ Point.				4 Points.							

A Table of Diff. of Latitude and Departure.										Distance.
Distance.	$3\frac{1}{4}$ Point.		$3\frac{1}{2}$ Point.		$3\frac{3}{4}$ Point.		4 Point.			
	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.		
31	24 9	18 5	24 0	19 6	23 0	20 8	21 9	21 9	31	
32	25 7	19 1	24 7	20 3	23 7	21 5	22 6	22 6	32	
33	26 5	19 7	25 5	20 9	24 4	22 1	23 4	23 3	33	
34	27 3	20 3	26 2	21 5	25 2	22 8	24 1	24 0	34	
35	28 1	20 9	27 0	22 2	25 9	23 5	24 8	24 7	35	
36	28 9	21 5	27 8	22 8	26 7	24 1	25 5	25 4	36	
37	29 7	22 1	28 6	23 4	27 4	24 8	26 2	26 2	37	
38	30 5	22 7	29 3	24 1	28 1	25 5	26 9	26 9	38	
39	31 3	23 3	30 1	24 7	28 9	26 2	27 6	27 6	39	
40	32 1	23 8	30 9	25 4	29 6	26 9	28 3	28 3	40	
41	32 9	24 4	31 6	26 0	30 4	27 5	29 0	29 0	41	
42	33 7	25 0	32 4	26 6	31 1	28 2	29 7	29 7	42	
43	34 5	25 6	33 2	27 2	31 9	28 9	30 4	30 4	43	
44	35 3	26 2	34 0	27 8	32 0	29 5	31 1	31 1	44	
45	35 1	26 8	34 8	28 4	33 4	30 2	31 8	31 8	45	
46	36 9	27 4	35 5	29 1	34 1	30 9	32 5	32 5	46	
47	37 7	28 0	36 3	29 7	34 9	31 5	33 2	33 2	47	
48	38 5	28 6	37 1	30 3	35 6	32 2	33 9	33 9	48	
49	39 3	29 2	37 9	31 0	36 3	32 9	34 7	34 7	49	
50	40 2	29 8	38 7	31 7	37 0	33 6	35 4	35 4	50	
51	41 0	30 4	39 5	32 3	37 8	34 3	36 1	36 1	51	
52	41 8	31 0	40 3	32 9	38 5	35 0	36 8	36 8	52	
53	42 6	31 6	41 1	33 6	39 2	35 6	37 5	37 5	53	
54	43 4	32 2	41 8	34 3	40 0	36 3	38 2	38 2	54	
55	44 2	32 8	42 6	34 9	40 8	37 0	38 9	38 9	55	
56	45 0	33 4	43 4	35 6	41 7	37 6	39 6	39 6	56	
57	45 8	34 0	44 2	36 2	42 8	38 3	40 3	40 3	57	
58	46 6	34 6	45 0	36 8	43 0	39 0	41 0	41 0	58	
59	47 4	35 2	45 8	37 4	43 8	39 6	41 7	41 7	59	
60	48 2	35 7	46 4	38 1	44 5	40 3	42 4	42 4	60	
Dep. Lat.		Dep. Lat.		Dep. Lat.		Dep. Lat.				
$4\frac{1}{4}$ Point.		$4\frac{1}{2}$ Point.		$4\frac{3}{4}$ Point.		4 Point.				

*The Use of the Table of the Difference of Latitude
and Departure.*

THIS Table on each Page contains ten Columns, in the two outmost Columns of each page stands the word *Distance*, it begins on the left hand page at 1, and is continued to 30, and on the right hand page it begins at 31, and is continued to 60; in these Columns you must find your Distance sailed: the other Columns of each page are distinguished by the Points and quarter Points of the Compasses, beginning at $\frac{1}{4}$ Point, and so $\frac{1}{2}$ Point, $\frac{3}{4}$ Point, 1 Point, and so increasing to 4 Points at the head of the Table, and beginning at 4 Points and increasing backward to 7 Points $\frac{3}{4}$ at the foot of the Table; every quarter Point containing two Columns, distinguished by the words *Lat.* and *Dep.* signifying the Difference of Latitude and Departure, at the head and foot of the Table.

The chief Use of this Table is this, the Course and Distance being given, to find the Diff. Lat. and Departure.

I. E X A M P L E.

A Ship sails S. E. by S. $\frac{1}{2}$ E. 57 m. or miles, I demand the Difference of Latitude and Departure.

Note, your Course must always be accounted from the North or South Point of the Compass, according as your Course is Northerly or Southerly.

So your Course being S. E. by S. $\frac{1}{2}$ E. it is 3 Points $\frac{1}{2}$ from the South towards the East, and therefore your Difference of Latitude is Southerly and your Departure Easterly. Turn to the Table of Difference of Latitude and Departure, and look for 3 Points $\frac{1}{2}$, which you will find at the head of the Table, then look for your Distance 57 in the Column of Distance, which you will find upon the right hand page, then right against 57 miles in the Distance, and under 3 Points $\frac{1}{2}$ the Course under *Lat.* your Diff. Lat. is 44.2 and under *Dep.* your Deprrture 36 2, that is, your Diff. Lat. is

The Use of the Table, &c.

44 miles and 2 tenths of a mile, and your Departure 36 miles and 2 tenths.

2. E X A M P L E.

A Ship sails N. W. by W. $\frac{1}{4}$ W. 46 Leagues, I demand the Difference of Latitude and Departure.

The Course is 5 Points $\frac{1}{4}$ from the North toward the West, therefore your Diff. Lat. is northerly, and your Departure Westerly: look for 5 Points $\frac{1}{4}$ which you will find at the foot of the Table, and 46 your Distance on the right hand page, then right against 46 and over 5 Points $\frac{1}{4}$ you will find your Diff. Lat. over the Word Lat. at the foot of the Table, to be 23 leagues and 6 tenths, and your Departure over the word Dep. to be 39 leagues and 4 tenths of a league.

II. How to make a Traverse by the Tables of the Difference of Latitude and Departure.

Example. Suppose a Ship sail upon her direct Course N. W. $\frac{1}{2}$ W. 50 miles or min. but then by reason of contrary winds (allowing Lee way) sails N. N. E. $\frac{1}{2}$ E. 20 miles, and S. W. $\frac{1}{2}$ W. 27 miles, and then N. N. W. $\frac{1}{4}$ W. 22 m. and W. N. W. $\frac{1}{2}$ W. 25 mil. to find Diff. Lat. and Dep. Make a Table of six Columns as here underneath, in the two first Columns insert your Course and Distance,

The Traverse Table

Course Sailed.	Distan. miles.	N.	S.	E.	W.
		Diff.	Lat.	Departure.	
N. W. $\frac{1}{2}$ W.	50	31 7			38 7
N. N. E. $\frac{1}{2}$ E.	20	17 6		09 4	
S. W. $\frac{1}{2}$ W.	27		17 2		21 0
N. N. W. $\frac{1}{4}$ W.	22	19 9			09 4
W. N. W. $\frac{1}{2}$ W.	25	06 0			24 2
		75 2	17 2	09 4	93 3
		17 2			09 4
		Diff. Lat.	58 0	Departure.	83 9

Then

The Use of the Table, &c.

Then by the Table of Difference of Latitude and Departure find your Difference of Latitude and Departure for your several Courses and Distances by the former directions, and place it in their proper Columns, that is, if your Course is between the North and the East, place your Difference of Latitude in the North Column and your Departure in the East. If your Course is between the North and the West, put your Difference of Latitude in the North Column, and your Departure in the West. If it is between the South and the East, your Difference of Latitude in the South Column and your Departure in the East. If it is between the South and the West, your Difference of Latitude in the South Column and your Departure in the West.

If the Ship sails directly North or directly South, she only makes Difference of Latitude, which is Northerly or Southerly according to the Course; and if she sail directly East or West, she only makes Departure, which is Easterly or Westerly according to the Course. Having thus placed your Difference of Latitude and Departure in their proper Columns of North, South, East and West, as you see in the foregoing Table; the sum of the North Column is 75.2, of the South 17.2, of the East 9.4, and of the West 93.3, then consider the Sum of the North and South Columns which is greatest, and subtract the least therefrom, and so likewise of the East and West Columns. So in the fore said Table the South Column subtracted from the North, the Remainder is 58.0, which is the Difference of Latitude Northerly, and the East Column subtracted from the West, the Remainder is 83.9, which is the Departure Westerly, which was required to be found.

A Table shewing what day of the Week the first day of March falls on; also the Epact, Dominical Letter, first Sunday in Lent, Easter-day and Whitsunday, for 20 years.

Anno Dom.	First of March.	Epact.	Let.	Sund.	Shrove-Sunday.	Easter-Day.	Whit-Sunday.
1695	Friday	25	F		March 3	April 25	May 12
1696	Sunday	6	ED		Feb. 23	April 12	May 31
1697	Monday	17	C		Feb. 14	April 4	May 23
1698	Tuesday	28	B		March 6	April 24	June 12
1699	Wednesday	9	A		Feb. 19	April 9	May 28
1700	Friday	10	GF		Feb. 11	March 31	May 19
1701	Saturday	1	E		March 2	April 20	June 8
1702	Sunday	12	D		Feb. 19	April 5	May 24
1703	Monday	23	C		Feb. 7	March 28	May 16
1704	Wednesday	4	BA		Feb. 27	April 16	June 4
1705	Thursday	15	G		Feb. 18	April 8	June 27
1706	Friday	26	F		Feb. 3	March 24	May 12
1707	Saturday	7	E		Feb. 23	April 13	June 1
1708	Monday	18	DC		Feb. 14	April 4	May 23
1709	Tuesday	29	B		March 6	April 24	May 12
1710	Wednesday	11	A		Feb. 19	April 9	May 28
1711	Thursday	22	G		Feb. 11	April 1	May 20
1712	Saturday	3	FE		Feb. 4	April 14	June 2
1713	Sunday	14	D		Feb. 16	April 6	May 25
1714	Monday	25	C		Feb. 8	March 20	May 17

A Perpetual Almanack.

Days of the Month the same day of the Week as the first of March.

March	1	8	15	22	29	November
August	2	9	16	23	30	August
May	3	10	17	24	31	January
October	4	11	18	25	00	October
April	5	12	19	26	00	July
September	6	13	20	27	00	December
June	7	14	21	28	00	February

The Use of this Almanack.

BY the former Table you may see what day of the Week the first of *March* falls on in any of those years, which being known you may readily find any day of the Week or Month throughout the year.

E X A M P L E

If you would know what day of the Week the 7 of *June* is 1696. Having seen by the Table that the first of *March* is *Sunday* look in the Column of the Almanack below against *June*, and you will find that the 7, 14, 21, 28. days of that Month are *Sundays*. Again, if you would know what day of the Month the third *Sunday* in *May* 1697 is; that year the first of *March* falling on *Monday*, looking in the Column of the Almanack even with *May*, I find the second *Monday* of that Month to be the 10th day, and the third *Sunday* to be the 16th.

Note, In this Computation the Year begins the first of March, and ends the last of February.

The Brief Use of the Table of Logarithms for Numbers, and of the Logarithmical Sines and Tangents.

1. The Use of Logarithms for Numbers.

THIS Table contains the Logarithms of Numbers, increasing in their natural Order, from 1 to 10000; every page containing 100 Logarithms, marked at top with 100, 200, 300, &c. and their use is,

1. A Number being given, to find the Logarithm thereto.

Suppose the given Number were 229, To find the Logarithm thereto.

Upon the page marked with 200, under (*Num.*) at the Top of the Page, look for the Number 229, and in the next adjoyning Column under (*Logarithm*) is 2.3598355, which is the Logarithm sought.

Suppose you were to find the Logarithm of 1497.

In the page marked with 1400, under (*Num.*) you will find the Number 1497, and in the adjoyning Column under (*Logarithm*) 3.1752218, the Logarithm sought.

The Use of the Table of Logarithms.

2. A Logarithm being given, to find the Numbers corresponding.

Suppose the given Logarithm were 2.9813655, to find the Number answering thereto.

Run down the Columns under (*Logarithm*) and in the Page marked with 900, you will find this Logarithm, and the Number answering thereto is 958, which was required.

Suppose the Logarithm given were 3.101852, to find the Number answering thereto.

Look down those Columns of Logarithms that begin with 3. and in the Page marked with 1200, you will find the nearest Logarithm thereto to be 3.1017471, and the Number answering thereto to be 1264, which was required.

II. The Use of the Table of Logarithmical Sines and Tangents.

THIS Table contains the *Logarithmical Sines and Tangents* of every Degree and Minute of the Quadrant, and their use is,

1. To find the Sine or Tangent of any Degree and Minute.

If the Degree be less than 45 your Sine or Tang. is found in those Columns, which are distinguished by the words (*Sine*) (*Tangent*) at the Head of the Table: but if the Degrees exceed 45, then your Sine or Tangent is found in those Columns which are distinguished with the word (*Sine*) (*Tang.*) at the Foot of the Table.

Suppose you were to find the Log. Sine or Tangent of 32 d. 12 m. Look for 32 d. at the Head of the Table, and upon the left hand page in the Column of Minutes under the word (*Min.*) you shall find 12 m. and against 12 m. and under (*Sine*) at the head of the Table, you shall find 9.7266264, which is the Log. Sine of 32 d. 12 m. and under (*Tang.*) you have 9.7991569, the Log. Tangent of 32 d. 12 m.

Suppose you were to find the Log. Sine or Tang. of 37 d. 47 m. Turn to 37 d. at the head of the Table, and upon the

The Use of the Table of

the right hand page (because the Minutes exceed 30) in the Column of Minutes under (*Min.*) you must look for 47 *m.* and against 47 *m.* and under (*Sine*) at the head of the Table you will find 9.7872317, the Sine of 37 *d.* 47 *m.* and against 47, and under (*Tang.*) you will find 9.8894214, the Tangent of 37 *d.* 47 *m.*

Suppose you were to find the Log. Sine or Tangent of 64 *d.* 15 *m.* Turn to 64 *d.* at the foot of the Table and upon the right hand page in the Column of Minutes, over the word (*Min.*) look upwards for 15 *m.* against 15 *m.* and over (*Sine*) at the Foot of the Table you will find 9.9545793, the Sine of 64 *d.* 15 *m.* and against 15 *m.* and over (*Tang.*) you will find 10.3166443, the Tangent of 64 *d.* 15 *m.*

Suppose you were to find the Log. Sine or Tangent of 78 *d.* 45 *m.* Turn to 78 *d.* at the Foot of the Table. and upon the left hand (because the Minutes exceed 30) in the Column of Minutes over (*Min.*) look for 45 *m.* against 45, and over (*Sine*) you find the Sine of 78 *d.* 45 *m.* to be 9.9915739, and the Tangent in the same Line over (*Tang.*) to be 10.7013382.

2. A Logarithmical Sine or Tangent being given, to find the Degrees and Minutes answering thereto.

This is but the Converse of the former, but that you may the more readily turn to the Degree and Minute take this brief Direction.

If it be a Sine, and the five first Figures less then 9.8494, or a Tangent less than Radius, or 10.0000000, then it is a Sine or Tangent of less than 45 *d.* and is to be sought in those Columns distinguished with (*Sine*) (*Tang.*) at the Head of the Table; but if the Sine or Tangent exceed these respective Numbers, then the Degrees answering thereto are more than 45, and they are to be found in those Columns distinguished by (*Sine*) (*Tang.*) at the Foot of the Table.

Suppose you were to find the Degrees and Minutes corresponding to this Sine 9.7035329. this being less than 45 I run over the Columns of Sines, distinguished by (*Sine*) at the Top, and under 30 *d.* and against 21 *m.* I find the given Sine.

Suppose

Logarithmical Sines and Tangents.

Suppose I were to find the Degree and Minute corresponding to this Tangent 10.3862939, this being greater than 45 *d.* I run over the Columns of Tangents, distinguished by (*Tang.*) at the Foot of the Table, and over 67 *d.* 39 *m.*

1. *Note*, If you are to find the Sine or Tangent of any Number of Degrees or Minutes exceeding 90. As Suppose you were to find the Tangent of 127 *d.* 39 *m.* subtract 127 *d.* 39 *m.* from 180 *d.* 0 *m.* and find the Tangent of the Remainder, *viz.* the Tangent 52 *d.* 21 *m.* which is also the Tangent 127 *d.* 39 *m.* as was required.

2. *Note*, That if it be required to find the Sine Complement or Tangent Complement of any Degree and Minute less than 90 *d.* you must look the Degrees and Minutes, as is before directed, and under (*Sine Complement*) or (*Tangent Complement*) at the Head of the Table; if your Degree be less than 45 *d.* or over (*Sine Complement*) or (*Tangent Complement*) at the Foot of the Table, if your Degree exceeds 45, you will find against the respective Minutes, the Sine Complement or Tangent Complement required.

Suppose it were required to find the Sine Complement or Tangent Complement of 36 *d.* 49 *m.* Turn to 36 *d.* at the Head of the Table, and under (*Sine Complement*) and right against 49 *m.* you will find 9.9033923, and under (*Tangent Complement*) 10.1257796, which is the Sine Complement or Tangent Complement required.

To find readily the Complement Arithmetical of a Logarithm.

The Complement Arithmetical of a Logarithm is the Residue of that Logarithm to 10.0000000, or to 20.0000000, as the Complement Arithmetical of 9.9198464 is 00801536, for if you subtract 9.9198464 from 10.0000000, the Remainder is 00801536: but a readier way is this, take the Residue or Remainder of the first figure to 9, and so of the rest, until you come to the last Figure, which take unto 10; thus to take the Complement Arithmetical of 9.9198464, for 9 put 0, for 9, 0, for 1, 8, for 9, 0, for 8, 1, for 4, 5, for 6, 3, for 4 (the last Figure) 6; and so I have 00801536, the Complement Arithmetical as before. If there be 2 Figures before the full point, as 10. 11. 12. or 13. you must then reject the first Figure, and take the Complement Arithmetical of the other as before, as suppose you were to find the Complement Arithmetical of 10.9652480, reject the first 1, then for 0 write 9, for 9, 0, for 6, 3, for 5, 4, for 2, 7, for 4, 5, for 8, 2, being the last Figure is 0, and then the 0 is the last place, so the Complement Arithmetical is 9.0347520.

A Table of the Angles which every Rhomb (or Point of the Compass) makes with the Meridian.

NORTH.	SOUTH.	Point	D.	M.	NORTH.	SOUTH.
			02	49		
			05	37		
			08	26		
N. by East.	S. by East.	1	11	15	N. by West	S. by West
			14	04		
			16	52		
			19	41		
N. N. E.	S. S. E.	2	22	30	N. N. W.	S. S. W.
			25	19		
			28	07		
			30	56		
N.E. by N.	S. E. by S.	3	33	45	N.W. by N	S. W. by S.
			36	34		
			39	22		
			42	11		
North East	South East	4	45	00	Nor. West	South West
			47	49		
			50	37		
			53	26		
N.E. by E	S. E. by E.	5	56	15	N.W. by W	S.W. by w.
			59	04		
			61	52		
			64	41		
E. N. E.	E. S. E.	6	67	30	W. N. W.	W. S. W.
			70	19		
			73	07		
			75	56		
E. by North	E. by South	7	78	45	W. by N.	W. by Sou.
			81	34		
			84	22		
			87	11		
East.	East.	8	90	00	West.	West.

A N
APPENDIX,
CONTAINING
The Use of the *Cross-staff*,
Quadrant and *Nocturnal*,
I N
NAVIGATION.

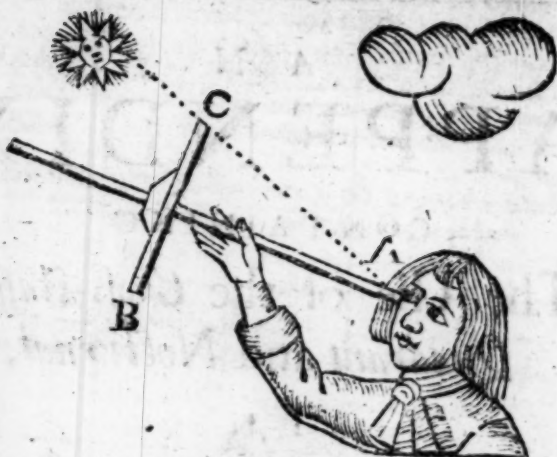
*The Description and Use of the Cross-staff,
or Fore-staff.*

THE *Cross-staff* consists of a *Staff* and three *Crosses* usually, the shortest is called the *Ten Cross*, and belongs to that side of the *Staff* where the Divisions begin at about 3 d. and end at 10 d. this *Cross* is supplied by the Breadth of the 30 *Cross*, the next longer is called the 30 *Cross*, and belongs to that side where the Division began, at 10 d. and end at 30, and is called the 30 *Side*. The next longer is called the 60 *Cross*, and belongs to that side where the Divisions begin at 20 d. and end at 60, and is called the 60 *Side*. The longest *Cross* is called the 90 *Cross*, and belongs to that side where the Division begins at 30 d. and ends at 90, and is called the 90 *Side* of the *Staff*.

H

The

The Use of the Cross-staff.



The Use of this *Cross-staff* is to observe the *Meridian Altitude* of the *Sun* or *Stars*, and the 10, 30, 60, and 90 *Crosses* are to be used according as the *Meridional Altitude* is greater or less, that is, if it be less than 10 d. use the 10 *Cross*, if less than 30 d. the 30 *Cross*, if less than 60 d. the 60 *Cross*; but if greater the 90 *Cross*.

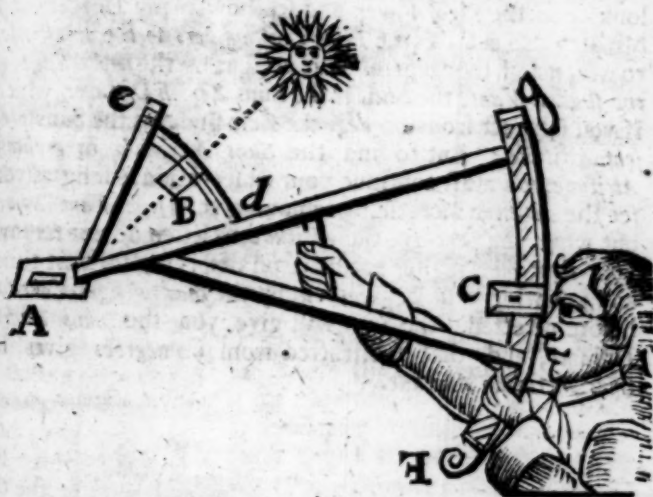
The manner to hold the *Staff* in time of Observation is thus, place the flat end of the *Staff* to the out-side of your *Eye*, as near as you can, not to hinder your *Sight*, and look at the upper end of the *Cross* for the *Sun* or *Star*, and at the lower end of the *Horizon*; but if you see the *Skie* instead of the *Horizon*, draw the *Cross* a little nearer your *Eye*, but if you see the *Sea* instead of the *Horizon*, put the *Cross* a little farther from your *Eye*, and so continue removing the *Cross*, until you see exactly the *Sun* or *Star* by the *Top* of the *Cross*, and the *Horizon* by the *Lower end* thereof. The *Deg.* and *Min.* cut by the *inner Edge* of the *Cross*, upon the side of the *Staff* peculiar to the *Cross* you use, is the present *Altitude* of the *Sun* or *Star*; but it being the *Meridian* or *greatest Altitude* which you are to find, you must continue your Observation

The Use of the Quadrant.

as long as you find the *Altitude increase*, still drawing the *Cross* nearer to your Eye; but when you perceive the *Altitude* is *diminished*, desist your Observation, and do not alter your *Cross* to remove it backward from your Eye, but as the *Cross* stands, count the *deg.* and *min.* on the side proper to the *Cross*, which gives the *Meridian Altitude* required, and the *Meridian Altitude* subtracted from 90 d. 00 m. gives the *Zenith Distance*.

And hence to find the *Latitude of the Place of Observation*, shall be shewn after the Use of the Quadrant.

The Description and Use of the Sea-Quadrant.



THIS Instrument is very convenient for to take the *Suns Altitude* at Sea, it consists of *three Vanes* and *two Arches*, they are called the *Horizon Vane* at A, the *Shadow Vane* at B, the *Sight Vane* at C, the *60 Arch* d e, and the *30 Arch* FG. The *60 Arch* is divided into 60 deg.

The Use of the Quadrant.

by every 5, and sometimes by every single degree, the 30 Arch is divided to every degree and 10 min. and also into 2 min by Diagonal Lines.

To observe with this Instrument, you must look through the small hole in the sight Vane, and so raise or depress your Quadrant, until the Shadow of the upper Edge of the Shadow-Vane fall upon the upper Edge of the Slit in the Horizon-Vane, and at the same time looking through the Slit in the Horizon-Vane, the upper Edge of the Slit may cut the Horizon; but if instead of the Horizon you see the Water, then remove your Sight-Vane a little lower, but if instead of the Horizon you see the Skie, then remove your Sight-Vane a little higher, and so continue removing your Sight-Vane, until (the Shadow falling in his due place) you exactly see the Horizon by the upper Edge of the Slit in the Horizon-Vane; then look upon the Sight-Vane, and see how many Degrees and Minutes are cut by the Edge that answers to the small hole, to which add the Degrees that are cut by the upper Edge of the shadow-Vane, the Sum is the Suns Zenith Distance, which if you subtract from 90 deg. the Remainder is the Suns present Altitude: But to find the Suns Meridian or greatest Altitude, you must continue your Observation as long as you see the Altitude increase, by removing your sight-Vane lower, but when you perceive the Altitude to lessen, do not remove your sight-Vane higher, but leave off observing for that time, and counting your Degrees cut by the shadow-sight-Vanes as before directed, the Sum will give you the Suns Zenith Distance, and that subtracted from 90 degrees gives the Suns Meridian Altitude.

Rules

The Use of the Quadrant.

Rules to find the Latitude of a Place by Observation of the Sun's Meridian Altitude.

YOU must first find the Sun's Zenith Distance by the Cross-staff or Quadrant, as you was directed, and then find the Sun's Declination for the day you observe in, by the Table of the Sun's Declination aforegoing, and thereby you may find the Lat. of the Place by the following Rules.

Rules for North Latitude.

I. IF the Sun's Declination be South, subtract the Declination from the Zenith Distance, the Remainder is the Latitude of the Place.

Example.

October 10. 1698. the Sun's Zenith Distance is 59 d. 06 m. and the Sun's Declination 10 d. 38 m. South, to find the Latitude of the Place.

The Zenith Distance	59 d. 06 m.
The Declination subtracted	10 38
The Latitude is	<hr/> 48 28

II. If the Sun's Declination be North, add the Sun's Declination to the Zenith Distance, the Sum is the Latitude of the Place.

III. If the Sun's Declination be North, and the Sun to the Northward, subtract the Zenith Distance from the Declination, the Remainder is the Latitude.

I. Example.

July 20. 1699. The Sun's Zenith Distance is 38 d. 12 m. and the Sun's Declination 18 d. 29 m. North, to find the Latitude of the Place.

The Zenith Distance	38 d. 12 m.
The Declination added	18 29
The Latitude	<hr/> 56 41

2. Example.

The Use of the Quadrant.

2. Example.

June 29. 1700. The Sun's Zenith is 12 d. 42 m. and the Declination 22 d. 17 m. North, the Sun being North at Noon, to find the Latitude of the Place.

The Declination	22 d. 17 m.
The Zenith Distance subtracted	12 42
The Latitude	<hr/> 9 35

Rules for the South Latitude.

- I. If the Declination be North, subtract the Declination from the Zenith Distance, the Remainder is the Latitude of the Place.

Example.

August 14. 1697. The Sun's Zenith Distance is 38 d. 17 m. and the Declination 10 d. 50 m. North, to find the Latitude of the Place.

The Zenith Distance	38 d. 17 m.
The Declination subtract	10 50
The Latitude	<hr/> 27 27

- II. If the Declination be South, add the Declination to the Zenith Distance, the Sum is the Latitude of the Place.
- III. If the Sun's Declination be South, and the Sun to the Southward, subtract the Zenith Distance from the Declination, the Remainder is the Latitude.

1. Example.

Decemb. 22. 1698. The Sun's Zenith Distance is 12 d. 37 m. and the Sun's Declination 23 d. 00 m. South, to find the Latitude of the Place.

The Zenith Distance	12 d. 37 m.
The Declination added	23 00
The Latitude	<hr/> 35 37

2. Example.

The Use of the Quadrant.

2. Example.

Decemb. 22. 1698. The Sun's Zenith Distance is 12 d. 37 m. the Declination 23 d. 00 m. South, the Sun being South at Noon, to find the Latitude of the Place.

The Declination	23 d. 00 m.
The Zenith Distance subtracted	12 37
The Latitude	10 23

Note 1. That if the Sun have no Declination, the Zenith Distance is the Latitude of the Place, and if the Sun be North at Noon, the Latitude is Northerly; if South at Noon, Southerly.

Note 2. That if the Sun be in your Zenith, then the Sun's Declination is the Latitude of the Place, and if the Declination be Southerly, your Latitude is Southerly; but if the Declination be Northerly, then your Latitude is Northerly.

Note 3. That if you observe any of the fixed Stars upon the same side of the *Meridian*, as you observe the Sun at Noon, the Rules are the same for the Stars as for the Sun before delivered.

The Description and Use of the Nocturnal.

THIS Instrument consists of three parts. The first and immoveable part, to which there is a handle to hold it by in time of Observation; upon the fore-side of which, in the outermost Circle, are the days of the Month, and upon the innermost twice 12 hours divided into quarters; on the back-side are the 32 Points of the Compass, and against them the corresponding Degrees and Minutes, to be added

The Use of the Nocturnal.

added or subtracted to or from the height of the Pole-Star, to find the height of the Pole or Latitude of the Place.

The second or middle part, contains two Circles and a small Index, and sometimes two small Indexes. The outermost Circle is divided into 29 days and an half, being the *Moon's* Age, and the innermost into twice 12 hours, being the *Moon's* Southing corresponding with her Age.

Nocturnals are commonly of two sorts, those for the *Great Bear* having *February* at the top, and those for the *Little Bear* having *April*; but sometimes one *Nocturnal* serves for the guards of both *Bears*, having two small Indexes, one marked with *G. B.* for the *Great Bear*, and the other with *L. B.* for the *Little Bear*, which are to be set to the day of the Month.

The Third and uppermost part is a long Index, the innermost Edge of which (respecting the Centre) is to cut the guards of the *Great* or *Little Bear* in time of Observation.

To use the *Nocturnal*, place the Index on the middle part to the day of the Month, hold the Instrument upright at some distance from the Eye, till you see the *Pole-Star* thro' the hole in the Centre of the *Nocturnal*; then turn the edge of the long Index to the guards (for which the *Nocturnal* was made) either of the *Great*, or *Little Bear*, on the back-side the Index, shews the Position of the Guards, commonly called the Point of the Compass, and also the corresponding Degrees and Minutes to be added or subtracted to or from the height of the *Pole-Star*, (found at the same time by the *Cross-Staff*) to find the height of the Pole. Also the long Index on the fore-side, cuts on the middle part of the *Nocturnal* the hour of the Night, which is little better than a guess, and not to be relied on.

A
TRIANGULAR
CANON

LOGARITHMICAL:

OR, A

TABLE

O F

Artificial Sines and Tangents

To every

Degree and Minute

O F T H E

QUADRANT.

The Common Radius being 10.0000000.

L O N D O N :

Printed for Rich. Mount, at the Postern
on Tower-hill, 1698.

o Degree.					
Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
0	0.0000000	10.0000000	0.0000000	Infinite	60
1	6.4637261	9.9999999	6.4637261	13.5362739	59
2	6.7647561	9.9999999	6.7647562	13.2352438	58
3	6.9408473	9.9999998	6.9408473	13.0391925	57
4	7.0657860	9.9999997	7.0657863	12.9342137	56
5	7.1626960	9.9999995	7.1626964	12.8373036	55
6	7.2418771	9.9999993	7.2418778	12.7581222	54
7	7.3088239	9.9999991	7.3088247	12.6911752	53
8	7.3668157	9.9999988	7.3668169	12.6331831	52
9	7.4179681	9.9999985	7.4179696	12.5820304	51
10	7.4637255	9.9999982	7.4637273	12.5362727	50
11	7.5051181	9.9999978	7.5051203	12.4948797	49
12	7.5429065	9.9999974	7.5429091	12.4570909	48
13	7.5776684	9.9999969	7.5776715	12.4223285	47
14	7.6098530	9.9999964	7.6098566	12.3901434	46
15	7.6398160	9.9999959	7.6398201	12.3601799	45
16	7.6678445	9.9999953	7.6678492	12.3321508	44
17	7.6941733	9.9999947	7.6941786	12.3058214	43
18	7.7189966	9.9999941	7.7190026	12.2809974	42
19	7.7424775	9.9999934	7.7424841	12.2575159	41
20	7.7647537	9.9999927	7.7647610	12.2352390	40
21	7.7859427	9.9999919	7.7859508	12.2140492	39
22	7.8061458	9.9999911	7.8061547	12.1938453	38
23	7.8254507	9.9999903	7.8254604	12.1745396	37
24	7.8439338	9.9999894	7.8439444	12.1560556	36
25	7.8616623	9.9999885	7.8616738	12.1383262	35
26	7.8786953	9.9999876	7.8787077	12.1212923	34
27	7.8950854	9.9999866	7.8950988	12.1049012	33
28	7.9108793	9.9999856	7.9108938	12.0891062	32
29	7.9261190	9.9999845	7.9261344	12.0738656	31
30	7.9408419	9.9999835	7.9408584	12.0591416	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

89 Degrees.

o Degree.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	7.9408419	9.9999835	7.9408584	12.0591416	30
31	7.9550815	9.9999823	7.9550996	12.0449004	29
32	7.9688698	9.9999812	7.9688886	12.0311114	28
33	7.9822334	9.9999800	7.9822534	12.0177466	27
34	7.9951980	9.9999788	7.9952192	12.0047808	26
35	8.0077867	9.9999775	8.0078092	11.9921908	25
36	8.0200207	9.9999762	8.0200445	11.9799555	24
37	8.0319195	9.9999748	8.0319446	11.9680554	23
38	8.0435009	9.9999735	8.0435274	11.9564726	22
39	8.0547814	9.9999721	8.0548094	11.9451906	21
40	8.0657763	9.9999706	8.0658057	11.9341943	20
41	8.0764997	9.9999691	8.0765306	11.9234694	19
42	8.0869646	9.9999676	8.0869970	11.9130030	18
43	8.0971832	9.9999660	8.0972172	11.9027828	17
44	8.1071669	9.9999644	8.1072025	11.8927975	16
45	8.1169262	9.9999628	8.1169634	11.8830366	15
46	8.1264710	9.9999611	8.1265099	11.8734901	14
47	8.1358104	9.9999594	8.1358510	11.8641490	13
48	8.1449532	9.9999577	8.1449956	11.8550044	12
49	8.1539075	9.9999559	8.1539516	11.8460484	11
50	8.1626808	9.9999541	8.1627267	11.8372733	10
51	8.1712804	9.9999522	8.1713282	11.8286718	9
52	8.1797129	9.9999503	8.1797626	11.8202374	8
53	8.1879848	9.9999484	8.1880364	11.8119636	7
54	8.1961020	9.9999464	8.1961556	11.8038444	6
55	8.2040703	9.9999444	8.2041259	11.7958741	5
56	8.2118949	9.9999424	8.2119526	11.7880474	4
57	8.2195811	9.9999403	8.2196408	11.7803592	3
58	8.2271335	9.9999382	8.2271953	11.7728047	2
59	8.2345568	9.9999360	8.2346208	11.7653792	1
60	8.2418553	9.9999338	8.2419215	11.7580785	0
	Sine Complement	Sine	Tangent Complement	Tang.	

89 Degrees.

A 2

Minutes	1 Degree.				Minutes
	Sine	Sine Complement	Tang.	Tangent Complement	
0	8.2418553	9.9999338	8.2419215	11.7580785	60
1	8.2490332	9.9999316	8.2491015	11.7508985	59
2	8.2560943	9.9999294	8.2561649	11.7438351	58
3	8.2630424	9.9999271	8.2631153	11.7368847	57
4	8.2698810	9.9999247	8.2699563	11.7300437	56
5	8.2766136	9.9999224	8.2766912	11.7233088	55
6	8.2832434	9.9999200	8.2833234	11.7166766	54
7	8.2897734	9.9999175	8.2898559	11.7101441	53
8	8.2960067	9.9999150	8.2962917	11.7037083	52
9	8.3025460	9.9999125	8.3026335	11.6973665	51
10	8.3087941	9.9999100	8.3088842	11.6911158	50
11	8.3149536	9.9999074	8.3150462	11.6849538	49
12	8.3210269	9.9999047	8.3211221	11.6788779	48
13	8.3270163	9.9999021	8.3271143	11.6728857	47
14	8.3329243	9.9998994	8.3330249	11.6669751	46
15	8.3387529	9.9998966	8.3388563	11.6611437	45
16	8.3445043	9.9998939	8.3446105	11.6553895	44
17	8.3501805	9.9998911	8.3502895	11.6497105	43
18	8.3557835	9.9998882	8.3558953	11.6441047	42
19	8.3613150	9.9998853	8.3614297	11.6385703	41
20	8.3667769	9.9998824	8.3668945	11.6331055	40
21	8.3721710	9.9998794	8.3722915	11.6277085	39
22	8.3774988	9.9998764	8.3776223	11.6223777	38
23	8.3827620	9.9998734	8.3828886	11.6171114	37
24	8.3879622	9.9998703	8.3880918	11.6119082	36
25	8.3931008	9.9998672	8.3932336	11.6067664	35
26	8.3981793	9.9998641	8.3983152	11.6016848	34
27	8.4031990	9.9998609	8.4033381	11.5966619	33
28	8.4081614	9.9998577	8.4083037	11.5916963	32
29	8.4130676	9.9998544	8.4132132	11.5867868	31
30	8.4179190	9.9998512	8.4180679	11.5819321	30
Sine Complement	Sine	Tangent Complement	Tang.		
88 Degrees.					

1 Degree.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement.	
30	8.4179190	9.9998512	8.4180679	11.5819321	30
31	8.4227168	9.9998478	8.4228590	11.5771310	29
32	8.4274611	9.9998445	8.4275176	11.5723824	28
33	8.4321561	9.9998411	8.4323150	11.5676850	27
34	8.4367999	9.9998376	8.4369622	11.5630378	26
35	8.4413944	9.9998342	8.4415603	11.5584397	25
36	8.4459409	9.9998306	8.4461103	11.5538889	24
37	8.4504402	9.9998271	8.4506131	11.5493869	23
38	8.4548934	9.9998235	8.4550699	11.5449301	22
39	8.4593013	9.9998199	8.4594814	11.5405185	21
40	8.4636649	9.9998162	8.4638486	11.5361514	20
41	8.4679850	9.9998125	8.4681725	11.5318275	19
42	8.4722626	9.9998088	8.4724538	11.5275462	18
43	8.4764984	9.9998050	8.4766933	11.5233067	17
44	8.4806932	9.9998012	8.4808920	11.5191080	16
45	8.4848479	9.9997974	8.4850505	11.5149495	15
46	8.4889632	9.9997935	8.4891596	11.5108304	14
47	8.4930398	9.9997896	8.4932502	11.5067498	13
48	8.4970784	9.9997856	8.4972928	11.5027072	12
49	8.5010798	9.9997817	8.5012982	11.4987018	11
50	8.5050447	9.9997776	8.5052671	11.4947329	10
51	8.5089736	9.9997736	8.5092001	11.4907999	9
52	8.5128673	9.9997695	8.5130978	11.4869022	8
53	8.5167264	9.9997653	8.5169610	11.4830387	7
54	8.5205514	9.9997612	8.5207902	11.4792098	6
55	8.5243437	9.9997570	8.5245860	11.4754140	5
56	8.5281017	9.9997527	8.5283490	11.4716510	4
57	8.5318281	9.9997484	8.5320797	11.4679203	3
58	8.5355228	9.9997441	8.5357787	11.4642213	2
59	8.5391863	9.9997398	8.5394466	11.4605534	1
60	8.5428192	9.9997354	8.5420838	11.4569162	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

88 Degrees.

A 3

2 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement.	Minutes
0	8.5428192	9.9997354	8.5430838	11.4569162	60
1	8.5464218	9.9997309	8.5466909	11.4533091	59
2	8.5499948	9.9997265	8.5502683	11.4497317	58
3	8.5535386	9.9997220	8.5538166	11.4461834	57
4	8.5570536	9.9997174	8.5573364	11.4426638	56
5	8.5605404	9.9997128	8.5608276	11.4391724	55
6	8.5639994	9.9997082	8.5642912	11.4357088	54
7	8.5674310	9.9997036	8.5677276	11.4322725	53
8	8.5708357	9.9996989	8.5711368	11.4288632	52
9	8.5742139	9.9996942	8.5745197	11.4254803	51
10	8.5775660	9.9996894	8.5778766	11.4221234	50
11	8.5808923	9.9996846	8.5812077	11.4187923	49
12	8.5841933	9.9996798	8.5845136	11.4154864	48
13	8.5874694	9.9996749	8.5877945	11.4122055	47
14	8.5907209	9.9996700	8.5910509	11.4089491	46
15	8.5939483	9.9996650	8.5942832	11.4057168	45
16	8.5971517	9.9996601	8.5974917	11.4025083	44
17	8.6003317	9.9996550	8.6006767	11.3993233	43
18	8.6034886	9.9996500	8.6038386	11.3961614	42
19	8.6066226	9.9996449	8.6069777	11.3930223	41
20	8.6097341	9.9996398	8.6100943	11.3899057	40
21	8.6128235	9.9996346	8.6131889	11.3868111	39
22	8.6158910	9.9996294	8.6162616	11.3837384	38
23	8.6189369	9.9996242	8.6193127	11.3806873	37
24	8.6219616	9.9996189	8.6223427	11.3776573	36
25	8.6249653	9.9996136	8.6253518	11.3746482	35
26	8.6279484	9.9996082	8.6283402	11.3716598	34
27	8.6309111	9.9996028	8.6313083	11.3686917	33
28	8.6338537	9.9995974	8.6342563	11.3657437	32
29	8.6367764	9.9995919	8.6371845	11.3628155	31
30	8.6396796	9.9995865	8.6400931	11.3599059	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

87 Degrees.

2 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	8.6396796	9.9996865	8.6400931	11.3599069	30
31	8.6425634	9.9995809	8.6429825	11.3570175	29
32	8.6454282	9.9995753	8.6458528	11.3541472	28
33	8.6482742	9.9995697	8.6487044	11.3512956	27
34	8.6511016	9.9995641	8.6515375	11.3484629	26
35	8.6539107	9.9995584	8.6543522	11.3456478	25
36	8.6567017	9.9995527	8.6571490	11.3428510	24
37	8.6594748	9.9995469	8.6599279	11.3400721	23
38	8.6622303	9.9995411	8.6626891	11.3373109	22
39	8.6649884	9.9995353	8.6654331	11.3345669	21
40	8.6676893	9.9995297	8.6681598	11.3318402	20
41	8.6703932	9.9995236	8.6708697	11.3291303	19
42	8.6730804	9.9995176	8.6735628	11.3264372	18
43	8.6757510	9.9995116	8.6762393	11.3237607	17
44	8.6784052	9.9995056	8.6788996	11.3211004	16
45	8.6810433	9.9994996	8.6815437	11.3184563	15
46	8.6836654	9.9994935	8.6841719	11.3158281	14
47	8.6862718	9.9994874	8.6867844	11.3132156	13
48	8.6888625	9.9994812	8.6893813	11.3106187	12
49	8.6914379	9.9994750	8.6919629	11.3080371	11
50	8.6939980	9.9994688	8.6945292	11.3054708	10
51	8.6965431	9.9994625	8.6970806	11.3029194	9
52	8.6990734	9.9994562	8.6996173	11.3003828	8
53	8.7015889	9.9994498	8.7021390	11.2978610	7
54	8.7040899	9.9994435	8.7046465	11.2953535	6
55	8.7065766	9.9994370	8.7071395	11.2928605	5
56	8.7090490	9.9994306	8.7096185	11.2903816	4
57	8.7115075	9.9994241	8.7120834	11.2879166	3
58	8.7139520	9.9994176	8.7145345	11.2854655	2
59	8.7163829	9.9994110	8.7169719	11.2830281	1
60	8.7188002	9.9994044	8.7193958	11.2806042	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

87 Degrees.

A 4

3 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
	Sine Complement	Sine	Tangent Complement	Tang.	
0	8.7188002	9.9994044	8.7193958	11.2806042	60
1	8.7212040	9.9993978	8.7218063	11.2781937	59
2	8.7235946	9.9993911	8.7242035	11.2757965	58
3	8.7259721	9.9993844	8.7265877	11.2734123	57
4	8.7283366	9.9993776	8.7289589	11.2710411	56
5	8.7306882	9.9993708	8.7313174	11.2686826	55
6	8.7330272	9.9993640	8.7336631	11.2663369	54
7	8.7353535	9.9993572	8.7359964	11.2640036	53
8	8.7376675	9.9993503	8.7383172	11.2616828	52
9	8.7399691	9.9993433	8.7406258	11.2593742	51
10	8.7422586	9.9993364	8.7429222	11.2570778	50
11	8.7445360	9.9993293	8.7452067	11.2547933	49
12	8.7468015	9.9993223	8.7474792	11.2525208	48
13	8.7490553	9.9993152	8.7497400	11.2502600	47
14	8.7512973	9.9993081	8.7519892	11.2480108	46
15	8.7535278	9.9993009	8.7542265	11.2457731	45
16	8.7557469	9.9992938	8.7564531	11.2435469	44
17	8.7579546	9.9992865	8.7586681	11.2413319	43
18	8.7601512	9.9992793	8.7608719	11.2391281	42
19	8.7623366	9.9992720	8.7630647	11.2369353	41
20	8.7645111	9.9992646	8.7652465	11.2347535	40
21	8.7666747	9.9992572	8.7674175	11.2325825	39
22	8.7688275	9.9992498	8.7695777	11.2304223	38
23	8.7709697	9.9992424	8.7717274	11.2282726	37
24	8.7731014	9.9992349	8.7738665	11.2261335	36
25	8.7752226	9.9992274	8.7759952	11.2240048	35
26	8.7773334	9.9992198	8.7781136	11.2218864	34
27	8.7794340	9.9992122	8.7802218	11.2197782	33
28	8.7815244	9.9992046	8.7823199	11.2176801	32
29	8.7836048	9.9991969	8.7844075	11.2155921	31
30	8.7856753	9.9991892	8.7864861	11.2135139	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

86 Degrees.

3 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	3.7856153	9.9991892	8.7864861	11.2135139	30
31	3.7877359	9.9991815	8.7885544	11.2114456	29
32	3.7897867	9.9991737	8.7906130	11.2093870	28
33	3.7918278	9.9991659	8.7926620	11.2073380	27
34	3.7938594	9.9991580	8.7947014	11.2052986	26
35	3.7958814	9.9991501	8.7967313	11.2032687	25
36	3.7978941	9.9991422	8.7987519	11.2012481	24
37	3.7998974	9.9991342	8.8007632	11.1992368	23
38	3.8018915	9.9991262	8.8027653	11.1972347	22
39	3.8038764	9.9991182	8.8047583	11.1952417	21
40	3.8058522	9.9991101	8.8067422	11.1932578	20
41	3.8078192	9.9991020	8.8087172	11.1912828	19
42	3.8097772	9.9990938	8.8106834	11.1893166	18
43	3.8117264	9.9990856	8.8126407	11.1873593	17
44	3.8136668	9.9990774	3.8145894	11.1854106	16
45	3.8155985	9.9990691	3.8165294	11.1834706	15
46	3.8175217	9.9990608	3.8184608	11.1815392	14
47	3.8194363	9.9990525	3.8203838	11.1796162	13
48	3.8213425	9.9990441	3.8222984	11.1777016	12
49	3.8232404	9.9990357	3.8242046	11.1757954	11
50	3.8251299	9.9990273	3.8261026	11.1738974	10
51	3.8270112	9.9990188	3.8279924	11.1720076	9
52	3.8288844	9.9990103	3.8298741	11.1701259	8
53	3.8307493	9.9990017	3.8317478	11.1682522	7
54	3.8326066	9.9989931	3.8336134	11.1663866	6
55	3.8344557	9.9989845	3.8354712	11.1645288	5
56	3.8362969	9.9989758	3.8373211	11.1626789	4
57	3.8381304	9.9989671	3.8391633	11.1608367	3
58	3.8399561	9.9989584	3.8409977	11.1590023	2
59	3.8417741	9.9989496	3.8428245	11.1571755	1
60	3.8435845	9.9989408	3.8446437	11.1553563	0
	Sine Complement	Sine	Tangent Complement	Tang.	

86 Degrees.

4 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	8.8435845	9.9989408	8.8446437	11.1553563	60
1	8.8453874	9.9989319	8.8464554	11.1535446	59
2	8.8471827	9.9989230	8.8482597	11.1517407	58
3	8.8489707	9.9989141	8.8500566	11.1499434	57
4	8.8507512	9.9989052	8.8518461	11.1481539	56
5	8.8525245	9.9988962	8.8536283	11.1463717	55
6	8.8542905	9.9988871	8.8554034	11.1445966	54
7	8.8560493	9.9988780	8.8571713	11.1428287	53
8	8.8578010	9.9988689	8.8589321	11.1410679	52
9	8.8595457	9.9988598	8.8606859	11.1393141	51
10	8.8612833	9.9988506	8.8624327	11.1375673	50
11	8.8630139	9.9988414	8.8641725	11.1358275	49
12	8.8647376	9.9988321	8.8659055	11.1340945	48
13	8.8664545	9.9988228	8.8676317	11.1323683	47
14	8.8681646	9.9988135	8.8693511	11.1306489	46
15	8.8698680	9.9988041	8.8710638	11.1289362	45
16	8.8715646	9.9987947	8.8727699	11.1272301	44
17	8.8732546	9.9987853	8.8744694	11.1255306	43
18	8.8749381	9.9987758	8.8761623	11.1238377	42
19	8.8766150	9.9987663	8.8778487	11.1221513	41
20	8.8782854	9.9987567	8.8795286	11.1204714	40
21	8.8799493	9.9987471	8.8812022	11.1187978	39
22	8.8816069	9.9987375	8.8828694	11.1171306	38
23	8.8832581	9.9987278	8.8845303	11.1154697	37
24	8.8849031	9.9987181	8.8861850	11.1138150	36
25	8.8865418	9.9987084	8.8878334	11.1121666	35
26	8.8881743	9.9986986	8.8894757	11.1105243	34
27	8.8898007	9.9986888	8.8911119	11.1088881	33
28	8.8914209	9.9986790	8.8927420	11.1072580	32
29	8.8930351	9.9986691	8.8943660	11.1056340	31
30	8.8946433	9.9986591	8.8959842	11.1040158	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

85 Degrees.

4 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	8.8946433	9.9986591	8.8959842	11.1040158	30
31	8.8962455	9.9986492	8.8975963	11.1024037	29
32	8.8978418	9.9986392	8.8992026	11.1007974	28
33	8.8994322	9.9986292	8.9008030	11.0991970	27
34	8.9010168	9.9986191	8.9023977	11.0976023	26
35	8.9025955	9.9986090	8.9039866	11.0960134	25
36	8.9041685	9.9985988	8.9055697	11.0944303	24
37	8.9057358	9.9985886	8.9071472	11.0928528	23
38	8.9072975	9.9985784	8.9087190	11.0912810	22
39	8.9088535	9.9985682	8.9102853	11.0897147	21
40	8.9104039	9.9985579	8.9118460	11.0881540	20
41	8.9119487	9.9985475	8.9134012	11.0865988	19
42	8.9134881	9.9985372	8.9149509	11.0850491	18
43	8.9150219	9.9985268	8.9164952	11.0835048	17
44	8.9165504	9.9985163	8.9180340	11.0819660	16
45	8.9180734	9.9985058	8.9195675	11.0804325	15
46	8.9195911	9.9984953	8.9210957	11.0789043	14
47	8.9211034	9.9984848	8.9226186	11.0773814	13
48	8.9226105	9.9984742	8.9241363	11.0758637	12
49	8.9241123	9.9984636	8.9256487	11.0743513	11
50	8.9256089	9.9984529	8.9271560	11.0728440	10
51	8.9271003	9.9984422	8.9286581	11.0713419	9
52	8.9285866	9.9984315	8.9301552	11.0698448	8
53	8.9300678	9.9984207	8.9316471	11.0683529	7
54	8.9315439	9.9984099	8.9331340	11.0668660	6
55	8.9330150	9.9983990	8.9346160	11.0653840	5
56	8.9344811	9.9983881	8.9360929	11.0639071	4
57	8.9359422	9.9983772	8.9375650	11.0624350	3
58	8.9373983	9.9983663	8.9390321	11.0609670	2
59	8.9388496	9.9983553	8.9404944	11.0595056	1
60	8.9402960	9.9983442	8.9419518	11.0580482	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes
85 Degrees.					

5 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	8.9402960	9.9983442	8.9419518	11.0580482	60
1	8.9417376	9.9983332	8.9434044	11.0565956	59
2	8.9431743	9.9983220	8.9448523	11.0551477	58
3	8.9446063	9.9983109	8.9462954	11.0537046	57
4	8.9460335	9.9982997	8.9477338	11.0522662	56
5	8.9474561	9.9982885	8.9491676	11.0508324	55
6	8.9488739	9.9982772	8.9505967	11.0494033	54
7	8.9502871	9.9982660	8.9520211	11.0479789	53
8	8.9516957	9.9982546	8.9534410	11.0465590	52
9	8.9530996	9.9982433	8.9548564	11.0451436	51
10	8.9544991	9.9982318	8.9562672	11.0437328	50
11	8.9558940	9.9982204	8.9576735	11.0423265	49
12	8.9572843	9.9982089	8.9590754	11.0409246	48
13	8.9586703	9.9981974	8.9604728	11.0395272	47
14	8.9600517	9.9981855	8.9618659	11.0381341	46
15	8.9614288	9.9981743	8.9632545	11.0367455	45
16	8.9628014	9.9981629	8.9646386	11.0353612	44
17	8.9641697	9.9981510	8.9660188	11.0339812	43
18	8.9655337	9.9981393	8.9673944	11.0326056	42
19	8.9668934	9.9981275	8.9687658	11.0312342	41
20	8.9682487	9.9981158	8.9701330	11.0298670	40
21	8.9695999	9.9981040	8.9714959	11.0285041	39
22	8.9709468	9.9980921	8.9728547	11.0271453	38
23	8.9722895	9.9980802	8.9742092	11.0257908	37
24	8.9736280	9.9980683	8.9755597	11.0244403	36
25	8.9749624	9.9980563	8.9769060	11.0230940	35
26	8.9762926	9.9980443	8.9782483	11.0217517	34
27	8.9776188	9.9980323	8.9795865	11.0204135	33
28	8.9789408	9.9980202	8.9809206	11.0190794	32
29	8.9802589	9.9980081	8.9822507	11.0177493	31
30	8.9815729	9.9979960	8.9835769	11.0164231	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

84 Degrees.

5 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
	Sine Complement	Sine	Tangent Complement	Tang.	
30	8.9815729	9.9979960	8.9835769	11.0164231	30
31	8.9828829	9.9979838	8.9848991	11.0151009	29
32	8.9841889	9.9979716	8.9862173	11.0137827	28
33	8.9854910	9.9979593	8.9875317	11.0124683	27
34	8.9867891	9.9979470	8.9888421	11.0111579	26
35	8.9880834	9.9979347	8.9901487	11.0098513	25
36	8.9893737	9.9979223	8.9914514	11.0085486	24
37	8.9906602	9.9979099	8.9927503	11.0072497	23
38	8.9919429	9.9978975	8.9940454	11.0059546	22
39	8.9932217	9.9978850	8.9953367	11.0046633	21
40	8.9944968	9.9978725	8.9966243	11.0033757	20
41	8.9957688	9.9978599	8.9979081	11.0020916	19
42	8.9970356	9.9978473	8.9991883	11.0008117	18
43	8.9982994	9.9978347	9.0004647	10.9995353	17
44	8.9995595	9.9978220	9.0017375	10.9982625	16
45	9.0008160	9.9978093	9.0030066	10.9969934	15
46	9.0020687	9.9977966	9.0042721	10.9957279	14
47	9.0033179	9.9977838	9.0055340	10.9944660	13
48	9.0045634	9.9977710	9.0067924	10.9932076	12
49	9.0058053	9.9977582	9.0080471	10.9919529	11
50	9.0070436	9.9977453	9.0092984	10.9907016	10
51	9.0082784	9.9977323	9.0105461	10.9894539	9
52	9.0095096	9.9977194	9.0117903	10.9882097	8
53	9.0107374	9.9977064	9.0130310	10.9869690	7
54	9.0119610	9.9976933	9.0142682	10.9857318	6
55	9.0131823	9.9976803	9.0155021	10.9844979	5
56	9.0143996	9.9976672	9.0167325	10.9832675	4
57	9.0156135	9.9976540	9.0179594	10.9820406	3
58	9.0168239	9.9976408	9.0191831	10.9808169	2
59	9.0180309	9.9976275	9.0204033	10.9795967	1
60	9.0192346	9.9976143	9.0216202	10.9783798	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

84 Degrees.

6 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.0192346	9.9976143	9.0216202	10.9783798	30
1	9.0204348	9.9976011	9.0228338	10.9771662	31
2	9.0216318	9.9975877	9.0240441	10.9759559	32
3	9.0228254	9.9975743	9.0252510	10.9747490	33
4	9.0240157	9.9975609	9.0264548	10.9735452	34
5	9.0252027	9.9975475	9.0276552	10.9723448	35
6	9.0263865	9.9975340	9.0288524	10.9711476	36
7	9.0275669	9.9975205	9.0300464	10.9699536	37
8	9.0287442	9.9975069	9.0312373	10.9687627	38
9	9.0299182	9.9974933	9.0324249	10.9675751	39
10	9.0310890	9.9974797	9.0336093	10.9663907	40
11	9.0322567	9.9974660	9.0347906	10.9652094	41
12	9.0334212	9.9974523	9.0359688	10.9640312	42
13	9.0345825	9.9974386	9.0371439	10.9628561	43
14	9.0357407	9.9974248	9.0383159	10.9616841	44
15	9.0368958	9.9974110	9.0394848	10.9605152	45
16	9.0380477	9.9973971	9.0406506	10.9593494	46
17	9.0391966	9.9973833	9.0418134	10.9581866	47
18	9.0403424	9.9973693	9.0429731	10.9570269	48
19	9.0414852	9.9973554	9.0441299	10.9558701	49
20	9.0426249	9.9973414	9.0452836	10.9547164	50
21	9.0437617	9.9973273	9.0464463	10.9535657	51
22	9.0448954	9.9973132	9.0475821	10.9524179	52
23	9.0460261	9.9972991	9.0487270	10.9512730	53
24	9.0471538	9.9972850	9.0498689	10.9501311	54
25	9.0482786	9.9972708	9.0510078	10.9489922	55
26	9.0494005	9.9972566	9.0521439	10.9478561	56
27	9.0505194	9.9972423	9.0532771	10.9467229	57
28	9.0516354	9.9972280	9.0544074	10.9455926	58
29	9.0527485	9.9972137	9.0555349	10.9444651	59
30	9.0538588	9.9971993	9.0566595	10.9433405	60
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

83 Degrees.

6 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.0538588	9.9971993	9.0566595	10.9433405	30
31	9.0549661	9.9971849	9.0577813	10.9422187	29
32	9.0560706	9.9971704	9.0589002	10.9410998	28
33	9.0571723	9.9971559	9.0600164	10.9399836	27
34	9.0582711	9.9971414	9.0611297	10.9388703	26
35	9.0593671	9.9971268	9.0622403	10.9377597	25
36	9.0604604	9.9971122	9.0633482	10.9366518	24
37	9.0615509	9.9970976	9.0644533	10.9355467	23
38	9.0626386	9.9970829	9.0655556	10.9344444	22
39	9.0637235	9.9970682	9.0666553	10.9333447	21
40	9.0648057	9.9970535	9.0677522	10.9322478	20
41	9.0658852	9.9970387	9.0688465	10.9311535	19
42	9.0669619	9.9970239	9.0699381	10.9300619	18
43	9.0680360	9.9970090	9.0710270	10.9289730	17
44	9.0691074	9.9969941	9.0721133	10.9278867	16
45	9.0701761	9.9969792	9.0731969	10.9268031	15
46	9.0712421	9.9969642	9.0742779	10.9257221	14
47	9.0723055	9.9969492	9.0753563	10.9246437	13
48	9.0733663	9.9969342	9.0764321	10.9235679	12
49	9.0744244	9.9969191	9.0775053	10.9224947	11
50	9.0754799	9.9969040	9.0785760	10.9214240	10
51	9.0765329	9.9968888	9.0796441	10.9203559	9
52	9.0775832	9.9968736	9.0807096	10.9192904	8
53	9.0786310	9.9968584	9.0817726	10.9182274	7
54	9.0796762	9.9968431	9.0828331	10.9171669	6
55	9.0807189	9.9968278	9.0838911	10.9161089	5
56	9.0817590	9.9968125	9.0849466	10.9150534	4
57	9.0827966	9.9967971	9.0859996	10.9140004	3
58	9.0838317	9.9967817	9.0870501	10.9129499	2
59	9.0848643	9.9967662	9.0880981	10.9119019	1
60	9.0858945	9.9967507	9.0891438	10.9108562	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

83 Degrees.

7 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.0858945	9.9967507	9.0891438	10.9108562	60
1	9.0869221	9.9967352	9.0901869	10.9098131	59
2	9.0879473	9.9967196	9.0912277	10.9087723	58
3	9.0889700	9.9967040	9.0922660	10.9077340	57
4	9.0899903	9.9966884	9.0933020	10.9066980	56
5	9.0910082	9.9966727	9.0943355	10.9056645	55
6	9.0920237	9.9966570	9.0953669	10.9046333	54
7	9.0930367	9.9966412	9.0963955	10.9036045	53
8	9.0940474	9.9966254	9.0974219	10.9025781	52
9	9.0950556	9.9966096	9.0984460	10.9015540	51
10	9.0960615	9.9965937	9.0994678	10.9005322	50
11	9.0970651	9.9965778	9.1004872	10.8995128	49
12	9.0980662	9.9965619	9.1015044	10.8984956	48
13	9.0990651	9.9965459	9.1025192	10.8974808	47
14	9.1000616	9.9965299	9.1035317	10.8964683	46
15	9.1010558	9.9965138	9.1045420	10.8954580	45
16	9.1020477	9.9964977	9.1055500	10.8944500	44
17	9.1030373	9.9964816	9.1065557	10.8934443	43
18	9.1040246	9.9964655	9.1075591	10.8924406	42
19	9.1050096	9.9964493	9.1085604	10.8914366	41
20	9.1059924	9.9964330	9.1095594	10.8904406	40
21	9.1069729	9.9964167	9.1105562	10.8894438	39
22	9.1079512	9.9964004	9.1115508	10.8884492	38
23	9.1089272	9.9963841	9.1125431	10.8874569	37
24	9.1099010	9.9963677	9.1135333	10.8864667	36
25	9.1108726	9.9963513	9.1145213	10.8854787	35
26	9.1118420	9.9963348	9.1155072	10.8844928	34
27	9.1128092	9.9963183	9.1164909	10.8835091	33
28	9.1137742	9.9963018	9.1174724	10.8825276	32
29	9.1147370	9.9962852	9.1184518	10.8815482	31
30	9.1156977	9.9962686	9.1194291	10.8805709	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

82 Degrees.

7 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.1156977	9.9962686	9.1194291	10.8805709	30
31	9.1166562	9.9962519	9.1204043	10.8795957	29
32	9.1176125	9.9962352	9.1213773	10.8786227	28
33	9.1185667	9.9962185	9.1223482	10.8776518	27
34	9.1195188	9.9962017	9.1233171	10.8766829	26
35	9.1204688	9.9961849	9.1242839	10.8757161	25
36	9.1214167	9.9961681	9.1252486	10.8747514	24
37	9.1223624	9.9961512	9.1262112	10.8737888	23
38	9.1233061	9.9961343	9.1271718	10.8728282	22
39	9.1242477	9.9961174	9.1281303	10.8718697	21
40	9.1251872	9.9961004	9.1290868	10.8709132	20
41	9.1261246	9.9960834	9.1300413	10.8699587	19
42	9.1270600	9.9960663	9.1309937	10.8690063	18
43	9.1279934	9.9960492	9.1319442	10.8680558	17
44	9.1289247	9.9960321	9.1328926	10.8671074	16
45	9.1298539	9.9960149	9.1338391	10.8661609	15
46	9.1307812	9.9959977	9.1347835	10.8652165	14
47	9.1317064	9.9959804	9.1357260	10.8642740	13
48	9.1326297	9.9959631	9.1366665	10.8633335	12
49	9.1335509	9.9959458	9.1376051	10.8623949	11
50	9.1344702	9.9959284	9.1385417	10.8614583	10
51	9.1353875	9.9959111	9.1394764	10.8605236	9
52	9.1363028	9.9958936	9.1404092	10.8595908	8
53	9.1372161	9.9958761	9.1413400	10.8586600	7
54	9.1381275	9.9958586	9.1422689	10.8577311	6
55	9.1390370	9.9958411	9.1431959	10.8568041	5
56	9.1399445	9.9958235	9.1441210	10.8558790	4
57	9.1408501	9.9958059	9.1450442	10.8549558	3
58	9.1417537	9.9957882	9.1459655	10.8540345	2
59	9.1426555	9.9957705	9.1468850	10.8531150	1
60	9.1435553	9.9957528	9.1478025	10.8521975	0
	Sine Complement	Sine	Tangent Complement	Tang.	

82 Degrees.

B

8 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.1435553	9.9957528	9.1478025	10.8521975	50
1	9.1444532	9.9957350	9.1487182	10.8512818	59
2	9.1453493	9.9957172	9.1496321	10.8503679	58
3	9.1462435	9.9956993	9.1505441	10.8494559	57
4	9.1471358	9.9956815	9.1514543	10.8485457	56
5	9.1480262	9.9956635	9.1523627	10.8476373	55
6	9.1489148	9.9956456	9.1532692	10.8467308	54
7	9.1498015	9.9956276	9.1541739	10.8458261	53
8	9.1506864	9.9956095	9.1550769	10.8449231	52
9	9.1515694	9.9955915	9.1559780	10.8440220	51
10	9.1524507	9.9955734	9.1568773	10.8431227	50
11	9.1533301	9.9955552	9.1577748	10.8422252	49
12	9.1542076	9.9955370	9.1586706	10.8413294	48
13	9.1550834	9.9955188	9.1595646	10.8404354	47
14	9.1559574	9.9955005	9.1604569	10.8395431	46
15	9.1568296	9.9954822	9.1613473	10.8386527	45
16	9.1577000	9.9954639	9.1622361	10.8377639	44
17	9.1585686	9.9954455	9.1631231	10.8368769	43
18	9.1594354	9.9954271	9.1640083	10.8359917	42
19	9.1603005	9.9954087	9.1648919	10.8351081	41
20	9.1611639	9.9953902	9.1657737	10.8342263	40
21	9.1620254	9.9953717	9.1666538	10.8333462	39
22	9.1628853	9.9953531	9.1675322	10.8324678	38
23	9.1637434	9.9953345	9.1684089	10.8315911	37
24	9.1645998	9.9953159	9.1692839	10.8307161	36
25	9.1654544	9.9952972	9.1701572	10.8298428	35
26	9.1663074	9.9952785	9.1710289	10.8289711	34
27	9.1671586	9.9952597	9.1718989	10.8281011	33
28	9.1680081	9.9952409	9.1727672	10.8272328	32
29	9.1688559	9.9952221	9.1736338	10.8263662	31
30	9.1697021	9.9952033	9.1744988	10.8255012	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

81 Degrees.

8 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.1697021	9.9952033	9.1744988	10.8255012	30
31	9.1705465	9.9951844	9.1753622	10.8246378	29
32	9.1713893	9.9951654	9.1762239	10.8237761	28
33	9.1722305	9.9951464	9.1770840	10.8229260	27
34	9.1730699	9.9951274	9.1779425	10.8220575	26
35	9.1739077	9.9951084	9.1787993	10.8212007	25
36	9.1747439	9.9950893	9.1796546	10.8203454	24
37	9.1755784	9.9950702	9.1805082	10.8194918	23
38	9.1764112	9.9950510	9.1813602	10.8186398	22
39	9.1772425	9.9950318	9.1822106	10.8177894	21
40	9.1780721	9.9950126	9.1830595	10.8169405	20
41	9.1789001	9.9949933	9.1839068	10.8160932	19
42	9.1797265	9.9949740	9.1847525	10.8152475	18
43	9.1805512	9.9949546	9.1855966	10.8144034	17
44	9.1813744	9.9949352	9.1864392	10.8135608	16
45	9.1821960	9.9949158	9.1872801	10.8127198	15
46	9.1830160	9.9948964	9.1881196	10.8118804	14
47	9.1838344	9.9948769	9.1889575	10.8110425	13
48	9.1846512	9.9948573	9.1897939	10.8102061	12
49	9.1854665	9.9948377	9.1906287	10.8093713	11
50	9.1862802	9.9948181	9.1914621	10.8085379	10
51	9.1870923	9.9947985	9.1922939	10.8077061	9
52	9.1879029	9.9947788	9.1931241	10.8068759	8
53	9.1887120	9.9947591	9.1939529	10.8060471	7
54	9.1895195	9.9947393	9.1947802	10.8052198	6
55	9.1903254	9.9947195	9.1956059	10.8043941	5
56	9.1911299	9.9946997	9.1964302	10.8035698	4
57	9.1919328	9.9946798	9.1972530	10.8027470	3
58	9.1927342	9.9946599	9.1980743	10.8019257	2
59	9.1935341	9.9946399	9.1988941	10.8011059	1
60	9.1943324	9.9946199	9.1997125	10.8002875	0
	Sine Complement	Sine	Tangent Complement	Tang.	
81 Degrees.			B 2		Minutes

9 Degrees.

9 Degrees.					
Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
0	9.1943324	9.9946199	9.1997125	10.8002875	50
1	9.1951293	9.9945999	9.2005294	10.7994706	59
2	9.1959247	9.9945798	9.2013449	10.7986551	58
3	9.1967186	9.9945597	9.2021588	10.7978411	57
4	9.1975110	9.9945396	9.2029714	10.7970286	56
5	9.1983019	9.9945194	9.2037825	10.7962175	55
6	9.1990913	9.9944992	9.2045922	10.7954078	54
7	9.1998793	9.9944789	9.2054004	10.7945996	53
8	9.2006658	9.9944587	9.2062072	10.7937928	52
9	9.2014509	9.9944383	9.2070126	10.7929874	51
10	9.2022345	9.9944180	9.2078165	10.7921835	50
11	9.2030167	9.9943975	9.2086191	10.7913809	49
12	9.2037974	9.9943771	9.2094203	10.7905797	48
13	9.2045766	9.9943566	9.2102200	10.7897800	47
14	9.2053545	9.9943361	9.2110184	10.7889816	46
15	9.2061309	9.9943156	9.2118153	10.7881847	45
16	9.2069059	9.9942950	9.2126109	10.7873891	44
17	9.2076795	9.9942743	9.2134051	10.7865949	43
18	9.2084516	9.9942537	9.2141980	10.7858020	42
19	9.2092224	9.9942330	9.2149894	10.7850106	41
20	9.2099917	9.9942122	9.2157795	10.7842205	40
21	9.2107597	9.9941914	9.2165683	10.7834317	39
22	9.2115263	9.9941706	9.2173556	10.7826444	38
23	9.2122914	9.9941498	9.2181417	10.7818583	37
24	9.2130552	9.9941280	9.2189264	10.7810736	36
25	9.2138176	9.9941079	9.2197097	10.7802903	35
26	9.2145787	9.9940870	9.2204917	10.7795083	34
27	9.2153384	9.9940659	9.2212724	10.7787276	33
28	9.2160967	9.9940449	9.2220518	10.7779482	32
29	9.2168536	9.9940238	9.2228298	10.7771702	31
30	9.2176092	9.9940027	9.2236065	10.7763935	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

9 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.2176092	9.9940027	9.2236065	10.7763935	30
31	9.2183635	9.9939815	9.2243819	10.7756181	29
32	9.2191164	9.9939603	9.2251561	10.7748439	28
33	9.2198680	9.9939391	9.2259289	10.7740711	27
34	9.2206182	9.9939178	9.2267004	10.7732996	26
35	9.2213671	9.9938965	9.2274706	10.7725294	25
36	9.2221147	9.9938752	9.2282395	10.7717605	24
37	9.2228609	9.9938538	9.2290071	10.7709929	23
38	9.2236059	9.9938324	9.2297735	10.7702265	22
39	9.2243495	9.9938109	9.2305386	10.7694614	21
40	9.2250918	9.9937894	9.2313024	10.7686976	20
41	9.2258328	9.9937679	9.2320650	10.7679350	19
42	9.2265725	9.9937463	9.2328262	10.7671738	18
43	9.2273110	9.9937247	9.2335863	10.7664137	17
44	9.2280481	9.9937030	9.2343451	10.7656545	16
45	9.2287839	9.9936813	9.2351026	10.7648974	15
46	9.2295185	9.9936596	9.2358589	10.7641411	14
47	9.2302518	9.9936378	9.2366139	10.7633861	13
48	9.2309838	9.9936160	9.2373678	10.7626322	12
49	9.2317145	9.9935942	9.2381203	10.7618797	11
50	9.2324440	9.9935723	9.2388717	10.7611283	10
51	9.2331722	9.9935504	9.2396218	10.7603782	9
52	9.2338992	9.9935285	9.2403708	10.7596292	8
53	9.2346249	9.9935065	9.2411185	10.7588815	7
54	9.2353494	9.9934844	9.2418650	10.7581350	6
55	9.2360726	9.9934624	9.2426103	10.7573897	5
56	9.2367946	9.9934403	9.2433543	10.7566457	4
57	9.2375153	9.9934181	9.2440972	10.7559028	3
58	9.2382349	9.9933959	9.2448389	10.7551611	2
59	9.2389532	9.9933737	9.2455794	10.7544206	1
60	9.2396702	9.9933515	9.2463188	10.7536812	0
	Sine Complement	Sine	Tangent Complement	Tang.	

80 Degrees.

B 3

10 Degrees.				
Minutes	Sine	Sine Complement	Tang.	Tangent Complement
0	9.2396702	9.9933515	9.2463188	10.7536812
1	9.2403861	9.9933292	9.2470569	10.7529431
2	9.2411007	9.9933068	9.2477939	10.7522061
3	9.2418141	9.9932845	9.2485297	10.7514703
4	9.2425264	9.9932621	9.2492643	10.7507357
5	9.2432374	9.9932396	9.2499978	10.7500022
6	9.2439472	9.9932171	9.2507301	10.7492699
7	9.2446558	9.9931946	9.2514612	10.7485388
8	9.2453632	9.9931720	9.2521912	10.7478088
9	9.2460695	9.9931494	9.2529200	10.7470800
10	9.2467746	9.9931268	9.2536477	10.7463523
11	9.2474784	9.9931041	9.2543743	10.7456257
12	9.2481811	9.9930814	9.2550997	10.7449003
13	9.2488827	9.9930587	9.2558240	10.7441760
14	9.2495830	9.9930359	9.2565472	10.7434528
15	9.2502822	9.9930131	9.2572691	10.7427308
16	9.2509803	9.9929902	9.2579901	10.7420099
17	9.2516772	9.9929673	9.2587099	10.7412901
18	9.2523729	9.9929444	9.2594285	10.7405715
19	9.2530675	9.9929214	9.2601461	10.7398539
20	9.2537609	9.9928984	9.2608625	10.7391375
21	9.2544532	9.9928753	9.2615779	10.7384221
22	9.2551444	9.9928522	9.2622921	10.7377079
23	9.2558344	9.9928291	9.2630053	10.7369947
24	9.2565233	9.9928059	9.2637173	10.7362827
25	9.2572110	9.9927827	9.2644283	10.7355717
26	9.2578977	9.9927595	9.2651382	10.7348618
27	9.2585832	9.9927362	9.2658470	10.7341530
28	9.2592676	9.9927129	9.2665547	10.7334453
29	9.2599509	9.9926895	9.2672613	10.7327387
30	9.2606330	9.9926661	9.2679669	10.7320331

Sine Complement

Sine

Tangent complement

Tang.

79 Degrees.

79 Degrees.

10 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.2606330	9.9926661	9.2679669	10.7320331	30
31	9.2613141	9.9926427	9.2686714	10.7313286	29
32	9.2619941	9.9926192	9.2693749	10.7306251	28
33	9.2626729	9.9925957	9.2700772	10.7299228	27
34	9.2633507	9.9925722	9.2707786	10.7292214	26
35	9.2640274	9.9925486	9.2714788	10.7285212	25
36	9.2647030	9.9925250	9.2721780	10.7278220	24
37	9.2653775	9.9925013	9.2728762	10.7271238	23
38	9.2660509	9.9924776	9.2735733	10.7264267	22
39	9.2667232	9.9924539	9.2742694	10.7257306	21
40	9.2673945	9.9924301	9.2749644	10.7250356	20
41	9.2680647	9.9924063	9.2756584	10.7243416	19
42	9.2687338	9.9923824	9.2763514	10.7236486	18
43	9.2694019	9.9923585	9.2770434	10.7229566	17
44	9.2700689	9.9923346	9.2777343	10.7222657	16
45	9.2707348	9.9923106	9.2784242	10.7215758	15
46	9.2713997	9.9922866	9.2791131	10.7208869	14
47	9.2720635	9.9922626	9.2798009	10.7201991	13
48	9.2727263	9.9922385	9.2804878	10.7195122	12
49	9.2733880	9.9922144	9.2811736	10.7188264	11
50	9.2740487	9.9921902	9.2818585	10.7181415	10
51	9.2747083	9.9921660	9.2825423	10.7174577	9
52	9.2753669	9.9921418	9.2832251	10.7167749	8
53	9.2760245	9.9921175	9.2839070	10.7160930	7
54	9.2766811	9.9920932	9.2845878	10.7154122	6
55	9.2773366	9.9920689	9.2852677	10.7147323	5
56	9.2779911	9.9920445	9.2859466	10.7140534	4
57	9.2786445	9.9920201	9.2866245	10.7133755	3
58	9.2792970	9.9919956	9.2873014	10.7126986	2
59	9.2799484	9.9919711	9.2879773	10.7120227	1
60	9.2805988	9.9919466	9.2886523	10.7113477	0
	Sine Complement	Sine	Tangent Complement	Tang.	

79 Degrees.

B 4

11 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.2805988	9.9919466	9.2886523	10.7113477	60
1	9.2812483	9.9919220	9.2893263	10.7106737	59
2	9.2818967	9.9918974	9.2899993	10.7100007	58
3	9.2825441	9.9918727	9.2906713	10.7093287	57
4	9.2831905	9.9918480	9.2913424	10.7086576	56
5	9.2838359	9.9918233	9.2920126	10.7079874	55
6	9.2844803	9.9917986	9.2926817	10.7073183	54
7	9.2851237	9.9917737	9.2933500	10.7066500	53
8	9.2857661	9.9917489	9.2940172	10.7059828	52
9	9.2864076	9.9917240	9.2946836	10.7053164	51
10	9.2870486	9.9916991	9.2953489	10.7046511	50
11	9.2876875	9.9916741	9.2960134	10.7039866	49
12	9.2883260	9.9916492	9.2966769	10.7033231	48
13	9.2889636	9.9916241	9.2973395	10.7026605	47
14	9.2896001	9.9915990	9.2980011	10.7019989	46
15	9.2902357	9.9915739	9.2986618	10.7013382	45
16	9.2908704	9.9915488	9.2993216	10.7006784	44
17	9.2915040	9.9915236	9.2999804	10.7000196	43
18	9.2921367	9.9914984	9.3006383	10.6993617	42
19	9.2927685	9.9914731	9.3012954	10.6987046	41
20	9.2933993	9.9914478	9.3019514	10.6980486	40
21	9.2940291	9.9914225	9.3026066	10.6973934	39
22	9.2946580	9.9913971	9.3032609	10.6967391	38
23	9.2952859	9.9913717	9.3039143	10.6960857	37
24	9.2959129	9.9913462	9.3045667	10.6954333	36
25	9.2965390	9.9913207	9.3052183	10.6947817	35
26	9.2971641	9.9912952	9.3058689	10.6941311	34
27	9.2977883	9.9912696	9.3065187	10.6934813	33
28	9.2984116	9.9912440	9.3071675	10.6928325	32
29	9.2990339	9.9912184	9.3078155	10.6921845	31
30	9.2996553	9.9911927	9.3084626	10.6915374	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

78 Degrees.

11 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.2996553	9.9911927	9.3084626	10.6915374	30
31	9.3002758	9.9911670	9.3091088	10.6908912	29
32	9.3008953	9.9911412	9.3097541	10.6902455	28
33	9.3015140	9.9911154	9.3103985	10.6896015	27
34	9.3021317	9.9910896	9.3110421	10.6889579	26
35	9.3027485	9.9910637	9.3116848	10.6883152	25
36	9.3033644	9.9910378	9.3123266	10.6876734	24
37	9.3039794	9.9910119	9.3129675	10.6870325	23
38	9.3045934	9.9909859	9.3136076	10.6863924	22
39	9.3052066	9.9909598	9.3142468	10.6857532	21
40	9.3058189	9.9909338	9.3148851	10.6851149	20
41	9.3064303	9.9909077	9.3155226	10.6844774	19
42	9.3070407	9.9908815	9.3161592	10.6838408	18
43	9.3076503	9.9908553	9.3167950	10.6832050	17
44	9.3082590	9.9908291	9.3174299	10.6825701	16
45	9.3088668	9.9908029	9.3180640	10.6819360	15
46	9.3094737	9.9907766	9.3186972	10.6813028	14
47	9.3100798	9.9907502	9.3193295	10.6806705	13
48	9.3106849	9.9907239	9.3199611	10.6800389	12
49	9.3112892	9.9906974	9.3205918	10.6794082	11
50	9.3118926	9.9906710	9.3212216	10.6787784	10
51	9.3124951	9.9906445	9.3218506	10.6781494	9
52	9.3130968	9.9906180	9.3224788	10.6775212	8
53	9.3136976	9.9905914	9.3231061	10.6768939	7
54	9.3142975	9.9905648	9.3237327	10.6762673	6
55	9.3148965	9.9905382	9.3243584	10.6756416	5
56	9.3154947	9.9905115	9.3249832	10.6750168	4
57	9.3160921	9.9904848	9.3256073	10.6743927	3
58	9.3166885	9.9904580	9.3262305	10.6737695	2
59	9.3172841	9.9904312	9.3268529	10.6731471	1
60	9.3178789	9.9904044	9.3274745	10.6725255	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

78 Degrees.

12 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement.	Minutes
0	9.3178789	9.9904044	9.3274745	10.6725255	50
1	9.3184728	9.9903775	9.3280953	10.6719047	59
2	9.3190659	9.9903506	9.3287153	10.6712847	58
3	9.3196581	9.9903237	9.3293345	10.6706655	57
4	9.3202495	9.9902967	9.3299528	10.6700472	56
5	9.3208400	9.9902697	9.3305704	10.6694296	55
6	9.3214297	9.9902426	9.3311872	10.6688128	54
7	9.3220186	9.9902155	9.3318031	10.6681969	53
8	9.3226066	9.9901883	9.3324183	10.6675817	52
9	9.3231938	9.9901612	9.3330327	10.6669673	51
10	9.3237802	9.9901339	9.3336463	10.6663537	50
11	9.3243657	9.9901067	9.3342591	10.6657409	49
12	9.3249505	9.9900794	9.3348711	10.6651289	48
13	9.3255344	9.9900521	9.3354823	10.6645177	47
14	9.3261174	9.9900247	9.3360927	10.6639073	46
15	9.3266997	9.9899973	9.3367024	10.6632976	45
16	9.3272811	9.9899698	9.3373113	10.6626887	44
17	9.3278617	9.9899423	9.3379194	10.6620806	43
18	9.3284416	9.9899148	9.3385267	10.6614733	42
19	9.3290206	9.9898873	9.3391333	10.6608667	41
20	9.3295983	9.9898597	9.3397391	10.6602609	40
21	9.3301761	9.9898320	9.3403441	10.6596559	39
22	9.3307527	9.9898043	9.3409484	10.6590516	38
23	9.3313285	9.9897766	9.3415519	10.6584481	37
24	9.3319035	9.9897489	9.3421546	10.6578454	36
25	9.3324777	9.9897211	9.3427566	10.6572434	35
26	9.3330511	9.9896932	9.3433578	10.6566422	34
27	9.3336237	9.9896654	9.3439583	10.6560417	33
28	9.3341955	9.9896374	9.3445580	10.6554420	32
29	9.3347665	9.9896095	9.3451570	10.6548430	31
30	9.3353368	9.9895815	9.3457552	10.6542448	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

77 Degrees.

12 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.3353368	9.9895815	9.3457552	10.6542448	30
31	9.3359062	9.9895535	9.3463527	10.6536473	29
32	9.3364749	9.9895254	9.3469494	10.6530506	28
33	9.3370428	9.9894973	9.3475454	10.6524546	27
34	9.3376099	9.9894692	9.3481407	10.6518593	26
35	9.3381762	9.9894410	9.3487352	10.6512648	25
36	9.3387418	9.9894128	9.3493290	10.6506710	24
37	9.3393065	9.9893845	9.3499220	10.6500780	23
38	9.3398706	9.9893562	9.3505143	10.6494857	22
39	9.3404338	9.9893279	9.3511059	10.6488941	21
40	9.3409963	9.9892995	9.3516968	10.6483032	20
41	9.3415580	9.9892711	9.3522869	10.6477131	19
42	9.3421190	9.9892427	9.3528763	10.6471237	18
43	9.3426792	9.9892142	9.3534650	10.6465350	17
44	9.3432386	9.9891856	9.3540530	10.6459470	16
45	9.3437973	9.9891571	9.3546402	10.6453598	15
46	9.3443552	9.9891285	9.3552267	10.6447733	14
47	9.3449124	9.9890998	9.3558126	10.6441874	13
48	9.3454688	9.9890711	9.3563977	10.6436023	12
49	9.3460245	9.9890424	9.3569821	10.6430179	11
50	9.3465794	9.9890137	9.3575658	10.6424342	10
51	9.3471336	9.9889849	9.3581487	10.6418513	9
52	9.3476870	9.9889560	9.3587310	10.6412690	8
53	9.3482397	9.9889271	9.3593126	10.6406874	7
54	9.3487917	9.9888982	9.3598935	10.6401065	6
55	9.3493429	9.9888693	9.3604736	10.6395264	5
56	9.3498934	9.9888403	9.3610531	10.6389469	4
57	9.3504432	9.9888113	9.3616319	10.6383681	3
58	9.3509922	9.9887822	9.3622100	10.6377900	2
59	9.3515405	9.9887531	9.3627874	10.6372126	1
60	9.3520880	9.9887239	9.3633641	10.6366359	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

77 Degrees.

13 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.3520880	9.9887239	9.3633641	10.6366359	60
1	9.3526349	9.9886947	9.3639401	10.6360599	59
2	9.3531810	9.9886655	9.3645155	10.6354845	58
3	9.3537264	9.9886363	9.3650901	10.6349099	57
4	9.3542710	9.9886070	9.3656641	10.6343359	56
5	9.3548150	9.9885776	9.3662374	10.6337626	55
6	9.3553582	9.9885482	9.3668100	10.6331900	54
7	9.3559007	9.9885188	9.3673819	10.6326181	53
8	9.3564426	9.9884894	9.3679532	10.6320468	52
9	9.3569836	9.9884599	9.3685238	10.6314762	51
10	9.3575240	9.9884303	9.3690937	10.6309063	50
11	9.3580637	9.9884008	9.3696629	10.6303371	49
12	9.3586027	9.9883712	9.3702315	10.6297685	48
13	9.3591409	9.9883415	9.3707994	10.6292005	47
14	9.3596785	9.9883118	9.3713667	10.6286333	46
15	9.3602154	9.9882821	9.3719333	10.6280657	45
16	9.3607515	9.9882523	9.3724992	10.6275008	44
17	9.3612870	9.9882225	9.3730645	10.6269355	43
18	9.3618217	9.9881927	9.3736291	10.6263709	42
19	9.3623558	9.9881628	9.3741930	10.6258070	41
20	9.3628892	9.9881329	9.3747563	10.6252437	40
21	9.3634219	9.9881029	9.3753190	10.6246810	39
22	9.3639539	9.9880729	9.3758810	10.6241190	38
23	9.3644852	9.9880429	9.3764423	10.6235577	37
24	9.3650158	9.9880128	9.3770030	10.6229970	36
25	9.3655458	9.9879827	9.3775631	10.6224369	35
26	9.3660750	9.9879525	9.3781225	10.6218775	34
27	9.3666036	9.9879223	9.3786813	10.6213187	33
28	9.3671315	9.9878921	9.3792394	10.6207606	32
29	9.3676587	9.9878618	9.3797969	10.6202043	31
30	9.3681853	9.9878315	9.3803537	10.6196463	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes
76 Degrees.					

13 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
	Sine Complement	Sine	Tangent Complement	Tang.	
30	9.3681853	9.9878315	9.3803537	10.6196463	30
31	9.3687111	9.9878012	9.3809100	10.6190900	29
32	9.3692363	9.9877708	9.3814655	10.6185345	28
33	9.3697608	9.9877404	9.3820205	10.6179795	27
34	9.3702847	9.9877099	9.3825748	10.6174252	26
35	9.3708079	9.9876794	9.3831285	10.6168715	25
36	9.3713304	9.9876488	9.3836816	10.6163184	24
37	9.3718523	9.9876183	9.3842340	10.6157660	23
38	9.3723735	9.9875876	9.3847858	10.6152142	22
39	9.3728940	9.9875570	9.3853370	10.6146630	21
40	9.3734139	9.9875263	9.3858876	10.6141124	20
41	9.3739331	9.9874955	9.3864376	10.6135624	19
42	9.3744517	9.9874648	9.3869869	10.6130131	18
43	9.3749696	9.9874339	9.3875356	10.6124664	17
44	9.3754868	9.9874031	9.3880837	10.6119163	16
45	9.3760034	9.9873722	9.3886312	10.6113688	15
46	9.3765194	9.9873413	9.3891781	10.6108219	14
47	9.3770347	9.9873103	9.3897244	10.6102756	13
48	9.3775493	9.9872793	9.3902700	10.6097300	12
49	9.3780633	9.9872482	9.3908151	10.6091849	11
50	9.3785767	9.9872171	9.3913595	10.6086405	10
51	9.3790894	9.9871860	9.3919034	10.6080966	9
52	9.3796015	9.9871549	9.3924466	10.6075537	8
53	9.3801129	9.9871236	9.3929893	10.6070107	7
54	9.3806237	9.9870924	9.3935313	10.6064687	6
55	9.3811339	9.9870611	9.3940727	10.6059273	5
56	9.3816434	9.9870298	9.3946136	10.6053864	4
57	9.3821523	9.9869984	9.3951538	10.6048462	3
58	9.3826605	9.9869670	9.3956935	10.6043065	2
59	9.3831682	9.9869356	9.3962326	10.6037674	1
60	9.3836752	9.9869041	9.3967711	10.6032289	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

76 Degrees.

14 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
0	9.3836752	9.9869041	9.3967711	10.6032289	60
1	9.3841815	9.9868726	9.3973089	10.6026911	59
2	9.3846873	9.9868410	9.3978463	10.6021537	58
3	9.3851924	9.9868094	9.3983830	10.6016170	57
4	9.3856969	9.9867778	9.3989191	10.6010809	56
5	9.3862008	9.9867461	9.3994547	10.6005453	55
6	9.3867040	9.9867144	9.3999896	10.6000104	54
7	9.3872067	9.9866827	9.4005240	10.5994760	53
8	9.3877087	9.9866509	9.4010578	10.5989422	52
9	9.3882101	9.9866191	9.4015910	10.5984090	51
10	9.3887109	9.9865872	9.4021237	10.5978763	50
11	9.3892111	9.9865553	9.4026558	10.5973442	49
12	9.3897106	9.9865232	9.4031873	10.5968127	48
13	9.3902096	9.9864913	9.4037182	10.5962818	47
14	9.3907079	9.9864593	9.4042486	10.5957514	46
15	9.3912057	9.9864273	9.4047784	10.5952216	45
16	9.3917028	9.9863952	9.4053076	10.5946924	44
17	9.3921993	9.9863630	9.4058363	10.5941637	43
18	9.3926952	9.9863308	9.4063644	10.5936356	42
19	9.3931905	9.9862986	9.4068919	10.5931081	41
20	9.3936852	9.9862663	9.4074189	10.5925811	40
21	9.3941794	9.9862340	9.4079453	10.5920547	39
22	9.3946729	9.9862017	9.4084712	10.5915288	38
23	9.3951658	9.9861693	9.4089965	10.5910035	37
24	9.3956581	9.9861369	9.4095212	10.5904788	36
25	9.3961499	9.9861045	9.4100454	10.5899546	35
26	9.3966410	9.9860720	9.4105690	10.5894310	34
27	9.3971315	9.9860394	9.4110921	10.5889079	33
28	9.3976215	9.9860069	9.4116146	10.5883854	32
29	9.3981109	9.9859742	9.4121366	10.5878634	31
30	9.3985996	9.9859416	9.4126581	10.5873419	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

75 Degrees.

14 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.3985996	9.9859416	9.4126581	10.5873419	30
31	9.3990878	9.9859089	9.4131789	10.5868211	29
32	9.3995754	9.9858762	9.4136993	10.5863007	28
33	9.4000625	9.9858434	9.4142191	10.5857809	27
34	9.4005489	9.9858106	9.4147383	10.5852617	26
35	9.4010348	9.9857777	8.4152570	10.5847430	25
36	9.4015201	9.9857449	9.4157752	10.5842248	24
37	9.4020048	9.9857119	9.4162928	10.5837072	23
38	9.4024889	9.9856790	9.4168099	10.5831901	22
39	9.4029734	9.9856460	9.4173265	10.5826735	21
40	9.4034554	9.9856129	9.4178425	10.5821575	20
41	9.4039378	9.9855798	9.4183580	10.5816420	19
42	9.4044196	9.9855467	9.4188729	10.5811271	18
43	9.4049009	9.9855135	9.4193874	10.5806126	17
44	9.4053816	9.9854803	9.4199013	10.5800987	16
45	9.4058617	9.9854471	9.4204146	10.5795854	15
46	9.4063413	9.9854138	9.4209275	10.5790725	14
47	9.4068203	9.9853805	9.4214398	10.5785602	13
48	9.4072987	9.9853471	9.4219515	10.5780485	12
49	9.4077766	9.9853138	9.4224628	10.5775372	11
50	9.4082539	9.9852803	9.4229735	10.5770265	10
51	9.4087306	9.9852468	9.4234838	10.5765162	9
52	9.4092068	9.9852133	9.4239935	10.5760065	8
53	9.4096824	9.9851798	9.4245026	10.5754974	7
54	9.4101575	9.9851462	9.4250113	10.5749887	6
55	9.4106320	9.9851125	9.4255194	10.5744806	5
56	9.4111059	9.9850789	9.4260271	10.5739729	4
57	9.4115793	9.9850452	9.4265342	10.5734658	3
58	9.4120522	9.9850114	9.4270408	10.5729592	2
59	9.4125245	9.9849776	9.4275469	10.5724531	1
60	9.4129962	9.9849438	9.4280525	10.5719475	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

75 Degrees.

15 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement.	
0	9.4129952	9.9849438	9.4280525	10.5719475	60
1	9.4134674	9.9849099	9.4285575	10.5714425	59
2	9.4139381	9.9848760	9.4290621	10.5709379	58
3	9.4144082	9.9848420	9.4295661	10.5704339	57
4	9.4148778	9.9848081	9.4300697	10.5699303	56
5	9.4153468	9.9847740	9.4305727	10.5694273	55
6	9.4158152	9.9847400	9.4310753	10.5689247	54
7	9.4162832	9.9847059	9.4315773	10.5684227	53
8	9.4167506	9.9846717	9.4320789	10.5679211	52
9	9.4172174	9.9846375	9.4325799	10.5674201	51
10	9.4176837	9.9846033	9.4330804	10.5669196	50
11	9.4181495	9.9845690	9.4335805	10.5664195	49
12	9.4186148	9.9845347	9.4340800	10.5659200	48
13	9.4190795	9.9845004	9.4345791	10.5654209	47
14	9.4195436	9.9844660	9.4350776	10.5649224	46
15	9.4200073	9.9844316	9.4355757	10.5644243	45
16	9.4204704	9.9843971	9.4360733	10.5639267	44
17	9.4209330	9.9843626	9.4365704	10.5634296	43
18	9.4213950	9.9843281	9.4370670	10.5629330	42
19	9.4218566	9.9842935	9.4375631	10.5624369	41
20	9.4223176	9.9842589	9.4380587	10.5619413	40
21	9.4227780	9.9842242	9.4385538	10.5614462	39
22	9.4232380	9.9841895	9.4390485	10.5609515	38
23	9.4236974	9.9841548	9.4395426	10.5604574	37
24	9.4241563	9.9841200	9.4400363	10.5599637	36
25	9.4246147	9.9840852	9.4405295	10.5594705	35
26	9.4250726	9.9840503	9.4410222	10.5589778	34
27	9.4255299	9.9840154	9.4415145	10.5584855	33
28	9.4259867	9.9839805	9.4420062	10.5579938	32
29	9.4264430	9.9839455	9.4424975	10.5575025	31
30	9.4268988	9.9839105	9.4429883	10.5570117	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

74 Degrees.

15 Degrees.					
Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.4268988	9.9839105	9.4429882	10.5570117	30
31	9.4273541	9.9838755	9.4434786	10.5565214	29
32	9.4278089	9.9838404	9.4439685	10.5560315	28
33	9.4282631	9.9838052	9.4444575	10.5555421	27
34	9.4287159	9.9837701	9.4449468	10.5550532	26
35	9.4291701	9.9837348	9.4454352	10.5545648	25
36	9.4296228	9.9836996	9.4459232	10.5540768	24
37	9.4300750	9.9836643	9.4464107	10.5535893	23
38	9.4305267	9.9836290	9.4468978	10.5531022	22
39	9.4309779	9.9835936	9.4473843	10.5526157	21
40	9.4314286	9.9835582	9.4478704	10.5521296	20
41	9.4318788	9.9835227	9.4483561	10.5516435	19
42	9.4323285	9.9834872	9.4488413	10.5511587	18
43	9.4327777	9.9834517	9.4493260	10.5506740	17
44	9.4332264	9.9834161	9.4498102	10.5501898	16
45	9.4336746	9.9833805	9.4502940	10.5497060	15
46	9.4341223	9.9833449	9.4507774	10.5492226	14
47	9.4345694	9.9833092	9.4512602	10.5487398	13
48	9.4350161	9.9832735	9.4517427	10.5482573	12
49	9.4354623	9.9832377	9.4522246	10.5477754	11
50	9.4359080	9.9832019	9.4527061	10.5472939	10
51	9.4363532	9.9831661	9.4531872	10.5468128	9
52	9.4367980	9.9831302	9.4536678	10.5463322	8
53	9.4372422	9.9830942	9.4541479	10.5458521	7
54	9.4376859	9.9830583	9.4546276	10.5453724	6
55	9.4381292	9.9830223	9.4551069	10.5448931	5
56	9.4385719	9.9829862	9.4555857	10.5444143	4
57	9.4390142	9.9829501	9.4560641	10.5439359	3
58	9.4394560	9.9829140	9.4565420	10.5434580	2
59	9.4398973	9.9828778	9.4570194	10.5429806	1
60	9.4403381	9.9828416	9.4574964	10.5425036	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes
74 Degrees. C					

16 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.4403281	9.9828416	9.4574964	10.5455036	50
1	9.4407784	9.9828054	9.4579730	10.5420270	59
2	9.4412182	9.9827691	9.4584491	10.5415509	58
3	9.4416576	9.9827328	9.4589248	10.5410752	57
4	9.4420965	9.9826964	9.4594001	10.5405995	56
5	9.4425345	9.9826600	9.4598749	10.5401251	55
6	9.4429728	9.9826236	9.4603492	10.5396508	54
7	9.4434103	9.9825871	9.4608232	10.5391768	53
8	9.4438472	9.9825506	9.4612967	10.5387033	52
9	9.4442837	9.9825140	9.4617697	10.5382303	51
10	9.4447197	9.9824774	9.4622423	10.5377577	50
11	9.4451553	9.9824408	9.4627145	10.5372855	49
12	9.4455904	9.9824041	9.4631863	10.5368137	48
13	9.4460250	9.9823674	9.4636576	10.5363424	47
14	9.4464591	9.9823306	9.4641285	10.5358715	46
15	9.4468927	9.9822938	9.4645990	10.5354010	45
16	9.4473259	9.9822569	9.4650690	10.5349310	44
17	9.4477586	9.9822201	9.4655386	10.5344614	43
18	9.4481909	9.9821831	9.4660078	10.5339922	42
19	9.4486227	9.9821462	9.4664765	10.5335235	41
20	9.4490540	9.9821092	9.4669448	10.5330552	40
21	9.4494849	9.9820721	9.4674127	10.5325873	39
22	9.4499153	9.9820351	9.4678802	10.5321198	38
23	9.4503452	9.9819979	9.4683473	10.5316527	37
24	9.4507747	9.9819608	9.4688139	10.5311861	36
25	9.4512037	9.9819236	9.4692801	10.5307199	35
26	9.4516322	9.9818863	9.4697459	10.5302541	34
27	9.4520603	9.9818490	9.4702112	10.5297888	33
28	9.4524879	9.9818117	9.4706762	10.5293238	32
29	9.4529151	9.9817744	9.4711407	10.5288593	31
30	9.4533418	9.9817370	9.4716048	10.5283952	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

73 Degrees.

Minutes

16 Degrees.

	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.4533418	9.9817370	9.4716048	10.5283952	30
31	9.4537581	9.9816995	9.4720685	10.5279315	29
32	9.4541939	9.9816620	9.4725318	10.5274682	28
33	9.4546192	9.9816245	9.4729947	10.5270053	27
34	9.4550441	9.9815870	9.4734571	10.5265428	26
35	9.4554686	9.9815494	9.4739192	10.5260808	25
36	9.4558926	9.9815117	9.4743808	10.5256192	24
37	9.4563161	9.9814740	9.4748421	10.5251575	23
38	9.4567392	9.9814363	9.4753029	10.5246971	22
39	9.4571618	9.9813986	9.4757633	10.5242367	21
40	9.4575840	9.9813608	9.4752233	10.5237767	20
41	9.4580058	9.9813229	9.4766829	10.5233171	19
42	9.4584271	9.9812850	9.4771421	10.5228575	18
43	9.4588480	9.9812471	9.4776009	10.522399	17
44	9.4592684	9.9812091	9.4780592	10.5219408	16
45	9.4596884	9.9811711	9.4785172	10.5214828	15
46	9.4601079	9.9811331	9.4789748	10.5210252	14
47	9.4605270	9.9810950	9.4794319	10.5205681	13
48	9.4609455	9.9810569	9.4798887	10.5201113	12
49	9.4613638	9.9810187	9.4803451	10.5196549	11
50	9.4617816	9.9809805	9.4808011	10.5191989	10
51	9.4621989	9.9809423	9.4812566	10.5187434	9
52	9.4626158	9.9809040	9.4817118	10.5182882	8
53	9.4630323	9.9808657	9.4821666	10.5178334	7
54	9.4634483	9.9808273	9.4826210	10.5173790	6
55	9.4638639	9.9807889	9.4830750	10.5169250	5
56	9.464279	9.9807505	9.4835286	10.5164714	4
57	9.4646938	9.9807120	9.4839818	10.5160182	3
58	9.4651081	9.9806735	9.4844346	10.5155654	2
59	9.4655219	9.9806349	9.4848870	10.5151130	1
60	9.4659353	9.9805963	9.4853390	10.5146610	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

73 Degrees.

C 2

17 Degrees.					
Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
0	9.4659353	9.9805963	9.4853390	10.5146610	50
1	9.4663483	9.9805577	9.4857907	10.5142093	59
2	9.4667609	9.9805190	9.4862419	10.5137581	58
3	9.4671730	9.9804803	9.4866928	10.5133072	57
4	9.4675848	9.9804415	9.4871433	10.5128567	56
5	9.4679960	9.9804027	9.4875933	10.5124067	55
6	9.4684069	9.9803639	9.4880430	10.5119570	54
7	9.4688173	9.9803250	9.4884924	10.5115076	53
8	9.4692273	9.9802860	9.4889413	10.5110587	52
9	9.4696369	9.9802471	9.4893898	10.5106102	51
10	9.4700461	9.9802081	9.4898380	10.5101620	50
11	9.4704548	9.9801690	9.4902858	10.5097142	49
12	9.4708631	9.9801299	9.4907332	10.5092668	48
13	9.4712710	9.9800908	9.4911802	10.5088198	47
14	9.4716785	9.9800516	9.4916269	10.5083731	46
15	9.4720856	9.9800124	9.4920731	10.5079269	45
16	9.4724922	9.9799732	9.4925190	10.5074810	44
17	9.4728985	9.9799339	9.4929646	10.5070354	43
18	9.4733043	9.9798946	9.4934097	10.5065903	42
19	9.4737097	9.9798552	9.4938545	10.5061455	41
20	9.4741146	9.9798158	9.4942988	10.5057012	40
21	9.4745192	9.9797764	9.4947429	10.5052571	39
22	9.4749234	9.9797369	9.4951865	10.5048135	38
23	9.4753271	9.9796973	9.4956298	10.5043702	37
24	9.4757304	9.9796578	9.4960727	10.5039273	36
25	9.4761334	9.9796182	9.4965152	10.5034848	35
26	9.4765359	9.9795785	9.4969574	10.5030426	34
27	9.4769380	9.9795388	9.4973991	10.5026009	33
28	9.4773396	9.9794991	9.4978406	10.5021594	32
29	9.4777409	9.9794593	9.4982816	10.5017184	31
30	9.4781418	9.9794195	9.4987223	10.5012777	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes
72 Degrees.					

17 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.4781418	9.9794195	9.4987223	10.5012777	30
31	9.4785423	9.9793796	9.4991626	10.5008374	29
32	9.4789423	9.9793398	9.4996026	10.5003974	28
33	9.4793420	9.9792998	9.5000422	10.4999578	27
34	9.4797412	9.9792599	9.5004814	10.4995186	26
35	9.4801401	9.9792198	9.5009203	10.4990797	25
36	9.4805385	9.9791798	9.5013588	10.4986412	24
37	9.4809366	9.9791397	9.5017969	10.4982031	23
38	9.4813342	9.9790996	9.5022347	10.4977653	22
39	9.4817315	9.9790594	9.5026721	10.4973279	21
40	9.4821283	9.9790192	9.5031092	10.4968908	20
41	9.4825248	9.9789789	9.5035459	10.4964541	19
42	9.4829208	9.9789386	9.5039822	10.4960178	18
43	9.4833165	9.9788983	9.5044182	10.4955818	17
44	9.4837117	9.9788579	9.5048538	10.4951462	16
45	9.4841066	9.9788175	9.5052891	10.4947109	15
46	9.4845010	9.9787770	9.5057240	10.4942760	14
47	9.4848951	9.9787365	9.5061586	10.4938414	13
48	9.4852888	9.9786960	9.5065928	10.4934072	12
49	9.4856820	9.9786554	9.5070267	10.4929733	11
50	9.4860740	9.9786148	9.5074602	10.4925398	10
51	9.4864674	9.9785741	9.5078933	10.4921067	9
52	9.4868595	9.9785334	9.5083261	10.4916739	8
53	9.4872512	9.9784927	9.5087586	10.4912414	7
54	9.4876426	9.9784519	9.5091907	10.4908093	6
55	9.4880335	9.9784111	9.5096224	10.4903776	5
56	9.4884240	9.9783702	9.5100539	10.4899461	4
57	9.4888142	9.9783293	9.5104849	10.4895151	3
58	9.4892040	9.9782883	9.5109156	10.4890844	2
59	9.4895934	9.9782474	9.5113460	10.4886540	1
60	9.4899824	9.9782063	9.5117760	10.4882240	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

72 Degrees.

C 3

18 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement.	Minutes
0	9.4899824	9.9782063	9.5117760	10.4882240	60
1	9.4903710	9.9781653	9.5122057	10.4877943	59
2	9.4907592	9.9781241	9.5126351	10.4873649	58
3	9.4911471	9.9780830	9.5130641	10.4869359	57
4	9.4915345	9.9780418	9.5134927	10.4865073	56
5	9.4919216	9.9780006	9.5139210	10.4860790	55
6	9.4923083	9.9779593	9.5143490	10.4856510	54
7	9.4926946	9.9779180	9.5147766	10.4852234	53
8	9.4930806	9.9778766	9.5152039	10.4847961	52
9	9.4934661	9.9778353	9.5156309	10.4843691	51
10	9.4938513	9.9777938	9.5160575	10.4839425	50
11	9.4942361	9.9777523	9.5164838	10.4835162	49
12	9.4946205	9.9777108	9.5169097	10.4830903	48
13	9.4950046	9.9776693	9.5173353	10.4826647	47
14	9.4953883	9.9776277	9.5177606	10.4822394	46
15	9.4957716	9.9775860	9.5181855	10.4818145	45
16	9.4961545	9.9775444	9.5186101	10.4813899	44
17	9.4965370	9.9775026	9.5190344	10.4809656	43
18	9.4969192	9.9774609	9.5194583	10.4805417	42
19	9.4973010	9.9774191	9.5198819	10.4801181	41
20	9.4976824	9.9773772	9.5203052	10.4796948	40
21	9.4980635	9.9773354	9.5207282	10.4792718	39
22	9.4984442	9.9772934	9.5211508	10.4788492	38
23	9.4988245	9.9772515	9.5215730	10.4784270	37
24	9.4992045	9.9772095	9.5219950	10.4780050	36
25	9.4995840	9.9771674	9.5224166	10.4775834	35
26	9.4999633	9.9771253	9.5228379	10.4771621	34
27	9.5003421	9.9770832	9.5232589	10.4767411	33
28	9.5007206	9.9770410	9.5236795	10.4763205	32
29	9.5010987	9.9769988	9.5240999	10.4759001	31
30	9.5014764	9.9769566	9.5245199	10.4754801	30
	Sine Complement	Sine	Tangent Complement.	Tang.	Minutes

71 Degrees.

Minutes	18 Degrees.				Minutes
	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.5014764	9.9769366	9.5245195	10.4754801	30
31	9.5018538	9.9769143	9.5249395	10.4750605	29
32	9.5022308	9.9768720	9.5253589	10.4746411	28
33	9.5026075	9.9768296	9.5257779	10.4742221	27
34	9.5029838	9.9767872	9.5261966	10.4738034	26
35	9.5033597	9.9767447	9.5266150	10.4733850	25
36	9.5037353	9.9767022	9.5270331	10.4729669	24
37	9.5041105	9.9766597	9.5274508	10.4725492	23
38	9.5044853	9.9766171	9.5278682	10.4721318	22
39	9.5048598	9.9765745	9.5282853	10.4717147	21
40	9.5052339	9.9765318	9.5287021	10.4712979	20
41	9.5056077	9.9764891	9.5291186	10.4708814	19
42	9.5059811	9.9764464	9.5295347	10.4704653	18
43	9.5063542	9.9764036	9.5299505	10.4700495	17
44	9.5067268	9.9763608	9.5303661	10.4696339	16
45	9.5070992	9.9763179	9.5307813	10.4692187	15
46	9.5074712	9.9762750	9.5311961	10.4688039	14
47	9.5078428	9.9762321	9.5316107	10.4683893	13
48	9.5082141	9.9761891	9.5320250	10.4679750	12
49	9.5085850	9.9761461	9.5324389	10.4675611	11
50	9.5089556	9.9761030	9.5328526	10.4671474	10
51	9.5093258	9.9760595	9.5332659	10.4667341	9
52	9.5096956	9.9760167	9.5336789	10.4663211	8
53	9.5100651	9.9759736	9.5340916	10.4659084	7
54	9.5104343	9.9759303	9.5345040	10.4654960	6
55	9.5108021	9.9758870	9.5349161	10.4650839	5
56	9.5111716	9.9758437	9.5353278	10.4646722	4
57	9.5115397	9.9758004	9.5357393	10.4642607	3
58	9.5119074	9.9757570	9.5361505	10.4638495	2
59	9.5122749	9.9757135	9.5365613	10.4634387	1
60	9.5126419	9.9756701	9.5369719	10.4630281	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes
71 Degrees.				C 4	

Minutes	19 Degrees.				Minutes
	Sine	Sine Complement	Tang.	Tangent Complement.	
0	9.5126415	9.9756701	9.5369718	10.4630281	60
1	9.5130086	9.9756265	9.5373821	10.4626179	59
2	9.5133750	9.9755830	9.5377920	10.4622080	58
3	9.5137410	9.9755394	9.5382017	10.4617983	57
4	9.5141067	9.9754957	9.5386110	10.4613890	56
5	9.5144721	9.9754521	9.5390200	10.4609800	55
6	9.5148371	9.9754083	9.5394287	10.4605713	54
7	9.5152017	9.9753646	9.5398371	10.4601629	53
8	9.5155660	9.9753208	9.5402453	10.4597547	52
9	9.5159300	9.9752769	9.5406531	10.4593469	51
10	9.5162936	9.9752330	9.5410606	10.4589394	50
11	9.5166569	9.9751891	9.5414678	10.4585322	49
12	9.5170198	9.9751451	9.5418747	10.4581253	48
13	9.5173824	9.9751011	9.5422813	10.4577187	47
14	9.5177447	9.9750570	9.5426877	10.4573123	46
15	9.5181066	9.9750129	9.5430937	10.4569063	45
16	9.5184682	9.9749688	9.5434994	10.4565006	44
17	9.5188295	9.9749246	9.5439048	10.4560952	43
18	9.5191904	9.9748804	9.5443100	10.4556900	42
19	9.5195510	9.9748361	9.5447148	10.4552852	41
20	9.5199112	9.9747918	9.5451193	10.4548807	40
21	9.5202711	9.9747475	9.5455236	10.4544764	39
22	9.5206307	9.9747031	9.5459276	10.4540724	38
23	9.5209899	9.9746587	9.5463312	10.4536688	37
24	9.5213488	9.9746142	9.5467346	10.4532654	36
25	9.5217074	9.9745697	9.5471377	10.4528623	35
26	9.5220656	9.9745252	9.5475405	10.4524595	34
27	9.5224235	9.9744806	9.5479430	10.4520570	33
28	9.5227811	9.9744359	9.5483452	10.4516548	32
29	9.5231383	9.9743913	9.5487471	10.4512529	31
30	9.5234953	9.9743466	9.5491487	10.4508513	30
	Sine Complement	Sine	Tangent Complement.	Tang.	Minutes
70 Degrees.					

19 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.5234953	9.9743466	9.5491487	10.4508513	30
31	9.5238518	9.9743018	9.5495500	10.4504500	29
32	9.5242081	9.9742570	9.5499511	10.4500489	28
33	9.5245640	9.9742122	9.5503519	10.4496481	27
34	9.5249196	9.9741673	9.5507523	10.4492477	26
35	9.5252745	9.9741224	9.5511525	10.4488475	25
36	9.5256298	9.9740774	9.5515524	10.4484476	24
37	9.5259844	9.9740324	9.5519521	10.4480479	23
38	9.5263387	9.9739873	9.5523514	10.4476486	22
39	9.5266927	9.9739422	9.5527504	10.4472496	21
40	9.5270463	9.9738971	9.5531492	10.4468508	20
41	9.5273997	9.9738519	9.5535477	10.4464523	19
42	9.5277526	9.9738067	9.5539459	10.4460541	18
43	9.5281053	9.9737615	9.5543438	10.4456562	17
44	9.5284577	9.9737162	9.5547415	10.4452585	16
45	9.5288097	9.9736709	9.5551388	10.4448612	15
46	9.5291614	9.9736255	9.5555359	10.4444641	14
47	9.5295128	9.9735801	9.5559327	10.4440673	13
48	9.5298638	9.9735346	9.5563292	10.4436708	12
49	9.5302146	9.9734891	9.5567255	10.4432745	11
50	9.5305650	9.9734435	9.5571214	10.4428786	10
51	9.5309151	9.9733980	9.5575171	10.4424829	9
52	9.5312649	9.9733523	9.5579125	10.4420875	8
53	9.5316143	9.9733067	9.5583077	10.4416923	7
54	9.5319635	9.9732610	9.5587025	10.4412975	6
55	9.5323123	9.9732152	9.5590971	10.4409029	5
56	9.5326608	9.9731694	9.5594914	10.4405086	4
57	9.5330090	9.9731236	9.5598854	10.4401146	3
58	9.5333569	9.9730777	9.5602792	10.4397208	2
59	9.5337044	9.9730318	9.5606727	10.4393273	1
60	9.5340517	9.9729858	9.5610659	10.4389341	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

70 Degrees.

20 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.5340517	9.9729858	9.5610659	10.4389341	60
1	9.5343986	9.9729398	9.5614588	10.4385412	59
2	9.5347452	9.9728938	9.5618515	10.4381485	58
3	9.5350915	9.9728477	9.5622439	10.4377551	57
4	9.5354375	9.9728016	9.5626360	10.4373640	56
5	9.5357832	9.9727554	9.5630278	10.4369722	55
6	9.5361286	9.9727092	9.5634194	10.4365806	54
7	9.5364737	9.9726629	9.5638107	10.4361893	53
8	9.5368184	9.9726166	9.5642018	10.4357982	52
9	9.5371628	9.9725703	9.5645925	10.4354075	51
10	9.5375069	9.9725239	9.5649831	10.4350169	50
11	9.5378508	9.9724775	9.5653733	10.4346267	49
12	9.5381943	9.9724310	9.5657633	10.4342367	48
13	9.5385375	9.9723845	9.5661530	10.4338470	47
14	9.5388804	9.9723380	9.5665424	10.4334576	46
15	9.5392230	9.9722914	9.5669316	10.4330684	45
16	9.5395653	9.9722448	9.5673205	10.4326795	44
17	9.5399073	9.9721981	9.5677091	10.4322909	43
18	9.5402489	9.9721514	9.5680975	10.4319025	42
19	9.5405903	9.9721047	9.5684856	10.4315144	41
20	9.5409314	9.9720579	9.5688735	10.4311265	40
21	9.5412721	9.9720110	9.5692611	10.4307389	39
22	9.5416126	9.9719642	9.5696484	10.4303516	38
23	9.5419527	9.9719172	9.5700355	10.4299645	37
24	9.5422926	9.9718703	9.5704223	10.4295777	36
25	9.5426321	9.9718233	9.5708088	10.4291912	35
26	9.5429713	9.9717762	9.5711951	10.4288049	34
27	9.5433103	9.9717291	9.5715811	10.4284189	33
28	9.5436480	9.9716820	9.5719669	10.4280331	32
29	9.5439873	9.9716348	9.5723524	10.4276476	31
30	9.5443253	9.9715876	9.5727377	10.4272623	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

69 Degrees.

20 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.5443253	9.9715876	9.5727377	10.4272623	30
31	9.5446630	9.9715404	9.5731227	10.4268773	29
32	9.5450005	9.9714931	9.5735071	10.4264925	28
33	9.5453376	9.9714457	9.5738919	10.4261081	27
34	9.5456745	9.9713984	9.5742761	10.4257235	26
35	9.5460110	9.9713509	9.5746601	10.4253390	25
36	9.5463472	9.9713035	9.5750438	10.4249562	24
37	9.5466832	9.9712560	9.5754272	10.4245728	23
38	9.5470189	9.9712084	9.5758104	10.4241895	22
39	9.5473542	9.9711608	9.5761934	10.4238066	21
40	9.5476893	9.9711132	9.5765761	10.4234230	20
41	9.5480240	9.9710655	9.5769585	10.4230415	19
42	9.5483585	9.9710178	9.5773407	10.4226593	18
43	9.5486927	9.9709701	9.5777226	10.4222774	17
44	9.5490266	9.9709223	9.5781043	10.4218957	16
45	9.5493602	9.9708744	9.5784858	10.4215142	15
46	9.5496935	9.9708265	9.5788669	10.4211331	14
47	9.5500265	9.9707786	9.5792475	10.4207521	13
48	9.5503592	9.9707306	9.5796286	10.4203714	12
49	9.5506916	9.9706826	9.5800090	10.4199910	11
50	9.5510237	9.9706346	9.5803892	10.4196108	10
51	9.5513556	9.9705865	9.5807691	10.4192309	9
52	9.5516871	9.9705383	9.5811488	10.4188512	8
53	9.5520184	9.9704902	9.5815282	10.4184718	7
54	9.5523494	9.9704419	9.5819074	10.4180926	6
55	9.5526801	9.9703937	9.5822864	10.4177136	5
56	9.5530105	9.9703454	9.5826651	10.4173349	4
57	9.5533406	9.9702970	9.5830435	10.4169565	3
58	9.5536704	9.9702486	9.5834217	10.4165783	2
59	9.5539999	9.9702002	9.5837997	10.4162003	1
60	9.5543292	9.9701517	9.5841774	10.4158226	0
	Sine	Sine	Tangent	Tang.	Minutes
	Complement		Complement		

69 Degrees.

Minutes	21 Degrees.				Minutes
	Sine	Sine Complement	Tang.	Tangent Complement	
0	9.5542292	9.9701517	9.5841774	10.4158226	60
1	9.5546581	9.9701032	9.5845549	10.4154451	59
2	9.5549868	9.9700547	9.5849321	10.4150679	58
3	9.5553152	9.9700061	9.5853091	10.4146909	57
4	9.5556433	9.9699574	9.5856859	10.4143141	56
5	9.5559711	9.9699087	9.5860624	10.4139376	55
6	9.5562987	9.9698600	9.5864386	10.4135614	54
7	9.5566259	9.9698112	9.5868147	10.4131853	53
8	9.5569529	9.9697624	9.5871904	10.4128096	52
9	9.5572796	9.9697136	9.5875660	10.4124340	51
10	9.5576060	9.9696647	9.5879413	10.4120587	50
11	9.5579321	9.9696158	9.5883163	10.4116837	49
12	9.5582579	9.9695668	9.5886912	10.4113088	48
13	9.5585835	9.9695177	9.5890657	10.4109343	47
14	9.5589088	9.9694687	9.5894401	10.4105599	46
15	9.5592338	9.9694196	9.5898142	10.4101858	45
16	9.5595585	9.9693704	9.5901881	10.4098119	44
17	9.5598829	9.9693212	9.5905617	10.4094383	43
18	9.5602071	9.9692720	9.5909351	10.4090649	42
19	9.5605310	9.9692227	9.5913082	10.4086918	41
20	9.5608546	9.9691734	9.5916812	10.4083188	40
21	9.5611779	9.9691240	9.5920539	10.4079461	39
22	9.5615010	9.9690746	9.5924263	10.4075737	38
23	9.5618237	9.9690252	9.5927985	10.4072015	37
24	9.5621462	9.9689757	9.5931705	10.4068295	36
25	9.5624685	9.9689262	9.5935422	10.4064577	35
26	9.5627904	9.9688766	9.5939138	10.4060862	34
27	9.5631121	9.9688270	9.5942851	10.4057149	33
28	9.5634335	9.9687773	9.5946561	10.4053439	32
29	9.5637546	9.9687276	9.5950269	10.4049731	31
30	9.5640754	9.9686779	9.5953975	10.4046025	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes
68 Degrees.					

12 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	0.5640754	9.9686779	9.5953975	10.4046025	30
31	9.5643960	9.9686281	9.5957679	10.4042321	29
32	9.5647163	9.9685783	9.5961380	10.4038620	28
33	9.5650363	9.9685284	9.5965079	10.4034921	27
34	9.5653561	9.9684785	9.5968776	10.4031224	26
35	9.5656756	9.9684286	9.5972470	10.4027530	25
36	9.5659948	9.9683786	9.5976162	10.4023838	24
37	9.5663137	9.9683285	9.5979852	10.4020148	23
38	9.5666324	9.9682784	9.5983540	10.4016460	22
39	9.5669508	9.9682283	9.5987225	10.4012775	21
40	9.5672689	9.9681781	9.5990908	10.4009092	20
41	9.5675868	9.9681279	9.5994588	10.4005411	19
42	9.5679044	9.9680777	9.5998267	10.4001733	18
43	9.5682217	9.9680274	9.6001943	10.3998057	17
44	9.5685387	9.9679771	9.6005617	10.3994383	16
45	9.5688555	9.9679267	9.6009289	10.3990711	15
46	9.5691721	9.9678763	9.6012958	10.3987042	14
47	9.5694883	9.9678258	9.6016625	10.3983375	13
48	9.5698043	9.9677753	9.6020290	10.3979710	12
49	9.5701200	9.9677247	9.6023953	10.3976047	11
50	9.5704355	9.9676741	9.6027613	10.3972387	10
51	9.5707506	9.9676235	9.6031271	10.3968729	9
52	9.5710656	9.9675728	9.6034927	10.3965073	8
53	9.5713802	9.9675221	9.6038581	10.3961419	7
54	9.5716946	9.9674713	9.6042233	10.3957767	6
55	9.5720087	9.9674205	9.6045882	10.3954118	5
56	9.5723226	9.9673697	9.6049529	10.3950471	4
57	9.5726362	9.9673188	9.6053174	10.3946826	3
58	9.5729495	9.9672679	9.6056817	10.3943183	2
59	9.5732626	9.9672169	9.6060457	10.3939543	1
60	9.5735754	9.9671659	9.6064096	10.3935904	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

68 Degrees.

22 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.5735754	9.9671655	9.6064056	10.3935904	60
1	9.5738880	9.9671148	9.6067732	10.3932268	59
2	9.5742003	9.9670637	9.6071356	10.3928634	58
3	9.5745123	9.9670125	9.6074997	10.3925003	57
4	9.5748240	9.9669614	9.6078627	10.3921373	56
5	9.5751356	9.9669101	9.6082254	10.3917746	55
6	9.5754468	9.9668588	9.6085880	10.3914120	54
7	9.5757578	9.9668075	9.6089503	10.3910497	53
8	9.5760685	9.9667562	9.6093124	10.3906876	52
9	9.5763790	9.9667048	9.6096742	10.3903258	51
10	9.5766892	9.9666533	9.6100359	10.3899641	50
11	9.5769991	9.9666018	9.6103977	10.3896027	49
12	9.5773088	9.9665503	9.6107586	10.3892414	48
13	9.5776183	9.9664987	9.6111196	10.3888804	47
14	9.5779275	9.9664471	9.6114804	10.3885196	46
15	9.5782364	9.9663954	9.6118409	10.3881591	45
16	9.5785450	9.9663437	9.6122013	10.3877987	44
17	9.5788535	9.9662920	9.6125615	10.3874385	43
18	9.5791616	9.9662402	9.6129214	10.3870786	42
19	9.5794695	9.9661884	9.6132812	10.3867188	41
20	9.5797772	9.9661365	9.6136407	10.3863593	40
21	9.5800845	9.9660846	9.6140000	10.3860000	39
22	9.5803917	9.9660326	9.6143591	10.3856409	38
23	9.5806986	9.9659806	9.6147180	10.3852820	37
24	9.5810052	9.9659285	9.6150766	10.3849234	36
25	9.5813116	9.9658764	9.6154351	10.3845649	35
26	9.5816177	9.9658243	9.6157934	10.3842066	34
27	9.5819236	9.9657721	9.6161514	10.3838486	33
28	9.5822292	9.9657199	9.6165093	10.3834907	32
29	9.5825345	9.9656677	9.6168669	10.3831331	31
30	9.5828397	9.9656153	9.6172243	10.3827757	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

67 Degrees.

22 Degrees.

Minutes	22 Degrees.				Minutes
	Sine	Sine Complement	Tang.	Tangent opp. to 1. - Ent.	
30	9.5828397	9.9656153	9.6172242	10.582775	30
31	9.5831445	9.9655630	9.6175815	10.3824185	25
32	9.5834491	9.9655106	9.6179385	10.3820615	28
33	9.5837535	9.9654582	9.6182953	10.3817047	27
34	9.5840576	9.9654057	9.6186515	10.3813481	26
35	9.5843615	9.9653532	9.6190083	10.3809917	25
36	9.5846651	9.9653005	9.6193645	10.3806355	24
37	9.5849685	9.9652480	9.6197205	10.3802795	23
38	9.5852716	9.9651953	9.6200762	10.3799238	22
39	9.5855745	9.9651426	9.6204318	10.379568.	21
40	9.5858771	9.9650899	9.6207872	10.3792128	20
41	9.5861795	9.9650371	9.6211423	10.3788577	19
42	9.5864816	9.9649843	9.6214973	10.3785026	18
43	9.5867835	9.9649314	9.6218520	10.3781480	17
44	9.5870851	9.9648785	9.6222066	10.3777934	16
45	9.5873865	9.9648256	9.6225609	10.3774391	15
46	9.5876876	9.9647726	9.6229150	10.3770850	14
47	9.5879885	9.9647195	9.6232690	10.3767310	13
48	9.5882892	9.9646665	9.6236227	10.3763773	12
49	9.5885896	9.9646133	9.6239763	10.3760237	11
50	9.5888897	9.9645602	9.6243296	10.3756704	10
51	9.5891897	9.9645061	9.6246827	10.3753173	9
52	9.5894893	9.9644537	9.6250356	10.3749644	8
53	9.5897888	9.9644004	9.6253884	10.3746116	7
54	9.5900880	9.9643470	9.6257401	10.3742591	6
55	9.5903869	9.9642937	9.6260922	10.3739068	5
56	9.5906856	9.9642402	9.6264454	10.3735546	4
57	9.5909841	9.9641868	9.6267973	10.3732027	3
58	9.5912822	9.9641332	9.6271491	10.3728505	2
59	9.5915803	9.9640797	9.6275006	10.3724984	1
60	9.5918780	9.9640261	9.6278519	10.3721481	0
	Sine Complement	Sine	Tangent complement	Tang.	Minutes

67 Degrees.

23 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.5918780	9.9640261	9.6278519	10.3721481	50
1	9.5921755	9.9639724	9.6282031	10.3717969	59
2	9.5924728	9.9639187	9.6285540	10.3714460	58
3	9.5927698	9.9638650	9.6289048	10.3710952	57
4	9.5930666	9.9638112	9.6292553	10.3707447	56
5	9.5933631	9.9637574	9.6296057	10.3703943	55
6	9.5936594	9.9637036	9.6299558	10.3700442	54
7	9.5939555	9.9636496	9.6303058	10.3696942	53
8	9.5942513	9.9635957	9.6306556	10.3693444	52
9	9.5945469	9.9635417	9.6310052	10.3689948	51
10	9.5948422	9.9634877	9.6313545	10.3686455	50
11	9.5951373	9.9634336	9.6317037	10.3682963	49
12	9.5954322	9.9633795	9.6320527	10.3679473	48
13	9.5957268	9.9633253	9.6324015	10.3675985	47
14	9.5960212	9.9632711	9.6327501	10.3672499	46
15	9.5963154	9.9632168	9.6330985	10.3669015	45
16	9.5966093	9.9631625	9.6334468	10.3665532	44
17	9.5969030	9.9631082	9.6337948	10.3662052	43
18	9.5971965	9.9630538	9.6341426	10.3658574	42
19	9.5974897	9.9629994	9.6344903	10.3655097	41
20	9.5977827	9.9629449	9.6348378	10.3651622	40
21	9.5980754	9.9628904	9.6351850	10.3648150	39
22	9.5983679	9.9628358	9.6355321	10.3644679	38
23	9.5986602	9.9627812	9.6358790	10.3641210	37
24	9.5989523	9.9627266	9.6362257	10.3637743	36
25	9.5992441	9.9626719	9.6365722	10.3634278	35
26	9.5995357	9.9626172	9.6369185	10.3630815	34
27	9.5998271	9.9625624	9.6372646	10.3627354	33
28	9.6001181	9.9625076	9.6376106	10.3623894	32
29	9.6004090	9.9624527	9.6379563	10.3620430	31
30	9.6006997	9.9623978	9.6383019	10.3616981	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

66 Degrees.

23 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.5006997	9.9623978	9.5383019	10.3616981	30
31	9.5009901	9.9623428	9.6386473	10.3613527	29
32	9.5012803	9.9622878	9.6389925	10.3610075	28
33	9.5015703	9.9622328	9.6393275	10.3606625	27
34	9.5018600	9.9621777	9.6396823	10.3603177	26
35	9.5021495	9.9621226	9.6400269	10.3599731	25
36	9.5024388	9.9620674	9.6403714	10.3596286	24
37	9.5027278	9.9620122	9.6407156	10.3592844	23
38	9.5030166	9.9619569	9.6410597	10.3589403	22
39	9.5033052	9.9619016	9.6414036	10.3585964	21
40	9.5035936	9.9618463	9.6417473	10.3582527	20
41	9.5038817	9.9617909	9.6420908	10.3579092	19
42	9.5041696	9.9617355	9.6424342	10.3575658	18
43	9.5044573	9.9616809	9.6427773	10.3572227	17
44	9.5047448	9.9616245	9.6431203	10.3568799	16
45	9.5050320	9.9615689	9.6434631	10.3565366	15
46	9.5053190	9.9615133	9.6438057	10.3561943	14
47	9.5056057	9.9614576	9.6441481	10.3558519	13
48	9.5058923	9.9614020	9.6444903	10.3555097	12
49	9.5061784	9.9613463	9.6448324	10.3551676	11
50	9.5064647	9.9612904	9.6451743	10.3548257	10
51	9.5067506	9.9612346	9.6455160	10.3544840	9
52	9.5070362	9.9611787	9.6458575	10.3541425	8
53	9.5073216	9.9611228	9.6461988	10.3538012	7
54	9.5076068	9.9610668	9.6465400	10.3534600	6
55	9.5078918	9.9610108	9.6468810	10.3531190	5
56	9.5081765	9.9609548	9.6472217	10.3527783	4
57	9.5084611	9.9608987	9.6475624	10.3524376	3
58	9.5087454	9.9608426	9.6479028	10.3520972	2
59	9.5090294	9.9607864	9.6482431	10.3517569	1
60	9.5093133	9.9607302	9.6485831	10.3514169	0
	Sine Complement	Sine	Tangent Complement	Tang.	

66 Degrees.

D

24 Degrees.

Minutes	Sine		Tang.		Minutes
	Sine	Sine Complement	Tangent	Tangent Complement	
0	9.6093133	9.9607302	0.6485831	10.3514169	60
1	9.6095969	9.9606739	9.6489230	10.3510770	59
2	9.6098803	9.9606176	9.6492628	10.3507372	58
3	9.6101635	9.9605612	6.6496023	10.3503977	57
4	9.6104465	9.9605048	9.6499417	10.3500583	56
5	9.6107293	9.9604484	9.6502809	10.3497191	55
6	9.6110118	9.9603919	9.6506199	10.3493801	54
7	9.6112941	9.9603354	9.6509587	10.3490413	53
8	9.6115762	9.9602788	9.6512974	10.3487026	52
9	9.6118580	9.9602222	9.6516359	10.3483641	51
10	9.6121397	9.9601655	9.6519742	10.3480258	50
11	9.6124211	9.9601088	9.6523123	10.3476877	49
12	9.6127023	9.9600520	9.6526503	10.3473497	48
13	9.6129833	9.9599952	9.6529881	10.3470119	47
14	9.6132641	9.9599384	9.6533257	10.3466743	46
15	9.6135446	9.9598815	9.6536631	10.3463369	45
16	9.6138250	9.9598246	9.6540004	10.3459996	44
17	9.6141051	9.9597676	9.6543375	10.3456625	43
18	9.6143850	9.9597106	9.6546744	10.3453256	42
19	9.6146647	9.9596535	9.6550112	10.3449888	41
20	9.6149441	9.9595964	9.6553477	10.3446523	40
21	9.6152234	9.9595393	9.6556841	10.3443159	39
22	9.6155024	9.9594821	9.6560204	10.3439796	38
23	9.6157812	9.9594248	9.6563564	10.3436436	37
24	9.6160598	9.9593675	9.6566923	10.3433077	36
25	9.6163382	9.9593102	9.6570280	10.3429720	35
26	9.6166164	9.9592528	9.6573636	10.3426364	34
27	9.6168944	9.9591954	9.6576989	10.3423011	33
28	9.6171721	9.9591380	9.6580341	10.3419659	32
29	9.6174496	9.9590805	9.6583692	10.3416308	31
30	9.6177270	9.9590229	9.6587041	10.3412960	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

65 Degrees.

24 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.6177270	9.9590229	9.6587041	10.3412960	30
31	9.6180041	9.9589653	9.6590387	10.3409613	29
32	9.6182809	9.9589077	9.6593733	10.3406267	28
33	9.6185576	9.9588500	9.6597076	10.3402924	27
34	9.6188341	9.9587923	9.6600418	10.3399582	26
35	9.6191103	9.9587345	9.6603758	10.3396242	25
36	9.6193864	9.9586767	9.6607097	10.3392903	24
37	9.6196622	9.9586188	9.6610434	10.3389566	23
38	9.6199378	9.9585609	9.6613769	10.3386231	22
39	9.6202132	9.9585030	9.6617103	10.3382897	21
40	9.6204884	9.9584450	9.6620434	10.3379566	20
41	9.6207634	9.9583869	9.6623765	10.3376235	19
42	9.6210382	9.9583288	9.6627093	10.3372907	18
43	9.6213127	9.9582707	9.6630420	10.3369580	17
44	9.6215871	9.9582125	9.6633745	10.3366255	16
45	9.6218612	9.9581543	9.6637069	10.3362931	15
46	9.6221351	9.9580961	9.6640391	10.3359609	14
47	9.6224088	9.9580378	9.6643711	10.3356289	13
48	9.6226824	9.9579794	9.6647030	10.3352970	12
49	9.6229557	9.9579210	9.6650346	10.3349654	11
50	9.6232287	9.9578626	9.6653662	10.3346338	10
51	9.6235016	9.9578041	9.6656975	10.3343025	9
52	9.6237743	9.9577456	9.6660288	10.3339712	8
53	9.6240467	9.9576870	9.6663598	10.3336402	7
54	9.6243190	9.9576284	9.6666907	10.3333093	6
55	9.6245911	9.9575697	9.6670214	10.3329786	5
56	9.6248629	9.9575110	9.6673519	10.3326481	4
57	9.6251346	9.9574522	9.6676823	10.3323177	3
58	9.6254060	9.9573934	9.6680126	10.3319874	2
59	9.6256772	9.9573346	9.6683426	10.3316574	1
60	9.6259483	9.9572757	9.6686725	10.3313275	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

65 Degrees.

D 2

25 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.6259483	9.9572757	9.668625	10.3313275	50
1	9.6262191	9.9572168	9.6690023	10.3309977	59
2	9.6264897	9.9571578	9.6693319	10.3306681	58
3	9.6267601	9.9570988	9.6696613	10.3303387	57
4	9.6270303	9.9570397	9.6699906	10.3300094	56
5	9.6273003	9.9569806	9.6703197	10.3296803	55
6	9.6275701	9.9569215	9.6706486	10.3293514	54
7	9.6278397	9.9568623	9.6709774	10.3290226	53
8	9.6281090	9.9568030	9.6713060	10.3286940	52
9	9.6283782	9.9567437	9.6716345	10.3283655	51
10	9.6286472	9.9566844	9.6719628	10.3280372	50
11	9.6289160	9.9566250	9.6722910	10.3277090	49
12	9.6291843	9.9565656	9.6726190	10.3273810	48
13	9.6294529	9.9565061	9.6729468	10.3270532	47
14	9.6297211	9.9564466	9.6732745	10.3267255	46
15	9.6299890	9.9563870	9.6736020	10.3263980	45
16	9.6302568	9.9563274	9.6739294	10.3260706	44
17	9.6305243	9.9562678	9.6742566	10.3257434	43
18	9.6307917	9.9562081	9.6745836	10.3254164	42
19	9.6310589	9.9561483	9.6749105	10.3250895	41
20	9.6313258	9.9560886	9.6752372	10.3247628	40
21	9.6315926	9.9560287	9.6755638	10.3244362	39
22	9.6318591	9.9559689	9.6758902	10.3241097	38
23	9.6321255	9.9559085	9.6762165	10.3237835	37
24	9.6323916	9.9558490	9.6765426	10.3234574	36
25	9.6326576	9.9557890	9.6768686	10.3231314	35
26	9.6329233	9.9557289	9.6771944	10.3228056	34
27	9.6331889	9.9556688	9.6775201	10.3224799	33
28	9.6334542	9.9556087	9.6778456	10.3221544	32
29	9.6337194	9.9555485	9.6781709	10.3218291	31
30	9.6339844	9.9554882	9.6784961	10.3215039	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minute

64 Degrees.

25 Degree.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.6339844	9.9554882	9.6784961	10.3215039	30
31	9.6342491	9.9554280	9.6788211	10.3211789	29
32	9.6345137	9.9553676	9.6791460	10.3208540	28
33	9.6347780	9.9553073	9.6794708	10.3205292	27
34	9.6350422	9.9552469	9.6797953	10.3202047	26
35	9.6353062	9.9551864	9.6801198	10.3198803	25
36	9.6355699	9.9551259	9.6804440	10.3195560	24
37	9.6358335	9.9550653	9.6807682	10.3192318	23
38	9.6360969	9.9550047	9.6810921	10.3189079	22
39	9.6363601	9.9549441	9.6814160	10.3185840	21
40	9.6366231	9.9548834	9.6817396	10.3182604	20
41	9.6368859	9.9548227	9.6820632	10.3179368	19
42	9.6371484	9.9547619	9.6823866	10.3176135	18
43	9.6374108	9.9547011	9.6827098	10.3172902	17
44	9.6376731	9.9546402	9.6830328	10.3169672	16
45	9.6379351	9.9545793	9.6833557	10.3166443	15
46	9.6381969	9.9545184	9.6836785	10.3163215	14
47	9.6384585	9.9544574	9.6840011	10.3159989	13
48	9.6387199	9.9543963	9.6843236	10.3156764	12
49	9.6389812	9.9543352	9.6846459	10.3153541	11
50	9.6392422	9.9542741	9.6849681	10.3150319	10
51	9.6395030	9.9542129	9.6852901	10.3147099	9
52	9.6397637	9.9541517	9.6856120	10.3143880	8
53	9.6400241	9.9540904	9.6859338	10.3140662	7
54	9.6402844	9.9540291	9.6862553	10.3137447	6
55	9.6405445	9.9539677	9.6865768	10.3134232	5
56	9.6408044	9.9539063	9.6868981	10.3131019	4
57	9.6410640	9.9538448	9.6872192	10.3127808	3
58	9.6413235	9.9537833	9.6875402	10.3124598	2
59	9.6415828	9.9537218	9.6878611	10.3121389	1
60	9.6418420	9.9536602	9.6881818	10.3118182	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

64 Degrees.

D 3

26 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.6418420	9.9536602	9.6881818	10.3118182	60
1	9.6421009	9.9535985	9.6885023	10.3114977	59
2	9.6423596	9.9535369	9.6888227	10.3111773	58
3	9.6426182	9.9534751	9.6891430	10.3108570	57
4	9.6428765	9.9534134	9.6894631	10.3105369	56
5	9.6431347	9.9533515	9.6897831	10.3102169	55
6	9.6433926	9.9532897	9.6901030	10.3098970	54
7	9.6436504	9.9532278	9.6904226	10.3095774	53
8	9.6439080	9.9531658	9.6907422	10.3092578	52
9	9.6441654	9.9531038	9.6910616	10.3089384	51
10	9.6444226	9.9530418	9.6913809	10.3086191	50
11	9.6446796	9.9529797	9.6917000	10.3083000	49
12	9.6449365	9.9529175	9.6920189	10.3079811	48
13	9.6451931	9.9528553	9.6923378	10.3076622	47
14	9.6454496	9.9527931	9.6926565	10.3073435	46
15	9.6457058	9.9527308	9.6929750	10.3070250	45
16	9.6459619	9.9526685	9.6932934	10.3067066	44
17	9.6462178	9.9526061	9.6936117	10.3063883	43
18	9.6464735	9.9525437	9.6939298	10.3060702	42
19	9.6467290	9.9524813	9.6942478	10.3057522	41
20	9.6469844	9.9524188	9.6945656	10.3054344	40
21	9.6472395	9.9523562	9.6948833	10.3051167	39
22	9.6474945	9.9522936	9.6952009	10.3047991	38
23	9.6477492	9.9522310	9.6955183	10.3044817	37
24	9.6480038	9.9521683	9.6958355	10.3041645	36
25	9.6482582	9.9521055	9.6961527	10.3038473	35
26	9.6485124	9.9520428	9.6964697	10.3035303	34
27	9.6487665	9.9519799	9.6967865	10.3032135	33
28	9.6490203	9.9519171	9.6971032	10.3028968	32
29	9.6492740	9.9518541	9.6974198	10.3025802	31
30	9.6495274	9.9517912	9.6977363	10.3022637	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

63 Degrees.

26 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.6495274	9.9517912	9.6977363	10.3022637	30
31	9.6497807	9.9517282	9.6980326	10.3019474	29
32	9.6500338	9.9516651	9.6983687	10.3016313	28
33	9.6502868	9.9516020	9.6986847	10.3013153	27
34	9.6505395	9.9515389	9.6990006	10.3009994	26
35	9.6507926	9.9514757	9.6993164	10.3006836	25
36	9.6510444	9.9514124	9.6996320	10.3003680	24
37	9.6512966	9.9513492	9.6999474	10.3000526	23
38	9.6515486	9.9512858	9.7002628	10.2997372	22
39	9.6518004	9.9512224	9.7005780	10.2994220	21
40	9.6520521	9.9511590	9.7008930	10.2991070	20
41	9.6523039	9.9510956	9.7012080	10.2987920	19
42	9.6525548	9.9510320	9.7015227	10.2984773	18
43	9.6528055	9.9509683	9.7018374	10.2981626	17
44	9.6530568	9.9509049	9.7021519	10.2978481	16
45	9.6533075	9.9508412	9.7024663	10.2975337	15
46	9.6535581	9.9507775	9.7027805	10.2972195	14
47	9.6538084	9.9507138	9.7030946	10.2969054	13
48	9.6540586	9.9506500	9.7034086	10.2965914	12
49	9.6543086	9.9505861	9.7037225	10.2962775	11
50	9.6545584	9.9505223	9.7040362	10.2959638	10
51	9.6548081	9.9504583	9.7043497	10.2956503	9
52	9.6550575	9.9503944	9.7046632	10.2953368	8
53	9.6553068	9.9503303	9.7049765	10.2950235	7
54	9.6555559	9.9502663	9.7052897	10.2947103	6
55	9.6558048	9.9502022	9.7056027	10.2943973	5
56	9.6560536	9.9501380	9.7059156	10.2940844	4
57	9.6563021	9.9500738	9.7062284	10.2937716	3
58	9.6565505	9.9500095	9.7065410	10.2934590	2
59	9.6567987	9.9499452	9.7068535	10.2931465	1
60	9.6570468	9.9498809	9.7071659	10.2928341	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

63 Degrees.

D 4

Minutes	27 Degrees.				Minutes
	Sine	St. e Complement	Tang.	Tangent Complement	
0	9.6570468	9.9498809	9.7071659	10.2928341	60
1	9.6572946	9.9498165	9.7074781	10.2925219	59
2	9.6575423	9.9497521	9.7077902	10.2922098	58
3	9.6577898	9.9496876	9.7081022	10.2918978	57
4	9.6580371	9.9496230	9.7084141	10.2915855	56
5	9.6582842	9.9495585	9.7087258	10.2912742	55
6	9.6585312	9.9494938	9.7090374	10.2909626	54
7	9.6587780	9.9494292	9.7093488	10.2906512	53
8	9.6590246	9.9493645	9.7096601	10.2903399	52
9	9.6592710	9.9492997	9.7099713	10.2900287	51
10	9.6595173	9.9492349	9.7102824	10.2897176	50
11	9.6597634	9.9491700	9.7105933	10.2894067	49
12	9.6600093	9.9491051	9.7109041	10.2890959	48
13	9.6602550	9.9490402	9.7112148	10.2887852	47
14	9.6605005	9.9489752	9.7115254	10.2884746	46
15	9.6607459	9.9489101	9.7118358	10.2881642	45
16	9.6609911	9.9488450	9.7121461	10.2878539	44
17	9.6612361	9.9487799	9.7124562	10.2875438	43
18	9.6614810	9.9487147	9.7127662	10.2872338	42
19	9.6617257	9.9486495	9.7130761	10.2869239	41
20	9.6619701	9.9485842	9.7133859	10.2866141	40
21	9.6622145	9.9485189	9.7136956	10.2863044	39
22	9.6624586	9.9484535	9.7140051	10.2859949	38
23	9.6627026	9.9483881	9.7143145	10.2856855	37
24	9.6629464	9.9483227	9.7146237	10.2853763	36
25	9.6631900	9.9482572	9.7149329	10.2850671	35
26	9.6634335	9.9481916	9.7152419	10.2847581	34
27	9.6636768	9.9481260	9.7155508	10.2844492	33
28	9.6639199	9.9480604	9.7158595	10.2841405	32
29	9.6641628	9.9479947	9.7161682	10.2838318	31
30	9.6644056	9.9479289	9.7164767	10.2835233	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minute

62 Degrees.

27 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.6644055	9.9479285	9.7164767	10.2835233	30
31	9.6646482	9.9478631	9.7167851	10.2832149	29
32	9.6648906	9.9477973	9.7170933	10.2829067	28
33	9.6651329	9.9477314	9.7174014	10.2825986	27
34	9.6653749	9.9476655	9.7177094	10.2822906	26
35	9.6656168	9.9475995	9.7180173	10.2819827	25
36	9.6658586	9.9475335	9.7183251	10.2816749	24
37	9.6661001	9.9474674	9.7186327	10.2813637	23
38	9.6663415	9.9474013	9.7189402	10.2810598	22
39	9.6665828	9.9473352	9.7192476	10.2807524	21
40	9.6668238	9.9472685	9.7195549	10.2804451	20
41	9.6670647	9.9472027	9.7198620	10.2801380	19
42	9.6673054	9.9471364	9.7201690	10.2798310	18
43	9.6675459	9.9470700	9.7204759	10.2795241	17
44	9.6677863	9.9470036	9.7207827	10.2792173	16
45	9.6680265	9.9469372	9.7210893	10.2789107	15
46	9.6682665	9.9468707	9.7213958	10.2786042	14
47	9.6685064	9.9468042	9.7217022	10.2782978	13
48	9.6687461	9.9467376	9.7220085	10.2779915	12
49	9.6689856	9.9466710	9.7223147	10.2776853	11
50	9.6692250	9.9466043	9.7226207	10.2773793	10
51	9.6694642	9.9465376	9.7229266	10.2770734	9
52	9.6697032	9.9464708	9.7232324	10.2767676	8
53	9.6699420	9.9464040	9.7235381	10.2764619	7
54	9.6701807	9.9463371	9.7238436	10.2761564	6
55	9.6704192	9.9462702	9.7241490	10.2758510	5
56	9.6706576	9.9462032	9.7244543	10.2755457	4
57	9.6708958	9.9461362	9.7247595	10.2752405	3
58	9.6711338	9.9460692	9.7250646	10.2749354	2
59	9.6713716	9.9460021	9.7253695	10.2746305	1
60	9.6716093	9.9459349	9.7256744	10.2743256	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

28 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
	Sine Complement	Sine	Tangent Complement	Tang.	
0	9.6716093	9.9459349	9.7256744	10.2743156	60
1	9.6718468	9.9458677	9.7259791	10.2740209	59
2	9.6720841	9.9458005	9.7262837	10.2737163	58
3	9.6723213	9.9457332	9.7265881	10.2734119	57
4	9.6725583	9.9456659	9.7268925	10.2731075	56
5	9.6727952	9.9455985	9.7271967	10.2728033	55
6	9.6730319	9.9455310	9.7275008	10.2724992	54
7	9.6732684	9.9454636	9.7278048	10.2721952	53
8	9.6735047	9.9453960	9.7281087	10.2718913	52
9	9.6737409	9.9453285	9.7284124	10.2715876	51
10	9.6739769	9.9452609	9.7287161	10.2712839	50
11	9.6742128	9.9451932	9.7290196	10.2709804	49
12	9.6744485	9.9451255	9.7293230	10.2706770	48
13	9.6746840	9.9450577	9.7296263	10.2703737	47
14	9.6749194	9.9449899	9.7299295	10.2700705	46
15	9.6751546	9.9449220	9.7302325	10.2697675	45
16	9.6753896	9.9448541	9.7305354	10.2694646	44
17	9.6756245	9.9447862	9.7308383	10.2691617	43
18	9.6758592	9.9447182	9.7311410	10.2688590	42
19	9.6760937	9.9446501	9.7314436	10.2685564	41
20	9.6763281	9.9445821	9.7317460	10.2682540	40
21	9.6765623	9.9445139	9.7320484	10.2679516	39
22	9.6767963	9.9444456	9.7323506	10.2676494	38
23	9.6770302	9.9443775	9.7326527	10.2673473	37
24	9.6772640	9.9443091	9.7329547	10.2670453	36
25	9.6774975	9.9442409	9.7332566	10.2667434	35
26	9.6777309	9.9441725	9.7335584	10.2664416	34
27	9.6779642	9.9441042	9.7338601	10.2661399	33
28	9.6781972	9.9440356	9.7341616	10.2658384	32
29	9.6784301	9.9449671	9.7344631	10.2655369	31
30	9.6786629	9.9448985	9.7347644	10.2652356	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

61 Degrees.

28 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement.	Minutes
30	9.6786629	9.9438985	9.7347644	10.2652356	30
31	9.6788955	9.9438299	9.7350656	10.2649344	29
32	9.6791279	9.9437612	9.7353667	10.2646333	28
33	9.6793602	9.9436925	9.7356677	10.2643322	27
34	9.6795923	9.9436238	9.7359685	10.2640315	26
35	9.6798243	9.9435549	9.7362693	10.2637307	25
36	9.6800560	9.9434861	9.7365699	10.2634301	24
37	9.6802877	9.9434172	9.7368705	10.2631295	23
38	9.6805191	9.9433482	9.7371709	10.2628291	22
39	9.6807504	9.9432792	9.7374712	10.2625288	21
40	9.6809816	9.9432102	9.7377714	10.2622287	20
41	9.6812126	9.9431411	9.7380715	10.2619285	19
42	9.6814434	9.9430720	9.7383714	10.2616286	18
43	9.6816741	9.9430028	9.7386713	10.2613287	17
44	9.6819046	9.9429335	9.7389710	10.2610290	16
45	9.6821349	9.9428643	9.7392707	10.2607293	15
46	9.6823651	9.9427949	9.7395702	10.2604298	14
47	9.6825952	9.9427255	9.7398696	10.2601304	13
48	9.6828250	9.9426561	9.7401689	10.2598311	12
49	9.6830548	9.9425866	9.7404681	10.2595319	11
50	9.6832843	9.9425171	9.7407672	10.2592328	10
51	9.6835137	9.9424476	9.7410662	10.2589338	9
52	9.6837430	9.9423779	9.7413650	10.2586350	8
53	9.6839720	9.9423083	9.7416638	10.2583362	7
54	9.6842010	9.9422386	9.7419624	10.2580376	6
55	9.6844297	9.9421688	9.7422609	10.2577391	5
56	9.6846583	9.9420990	9.7425594	10.2574406	4
57	9.6848868	9.9420291	9.7428577	10.2571423	3
58	9.6851151	9.9419592	9.7431559	10.2568441	2
59	9.6853432	9.9418893	9.7434540	10.2565460	1
60	9.6855712	9.9418193	9.7437520	10.2562480	0
	Sine Complement	Sine	Tangent Complement.	Tang.	Minutes

61 Degrees.

Minutes	29 Degrees.					
	Sine	Sine Complement	Tang.	Tangent Complement		
0	9.685571	9.5418193	9.7437520	10.2562480	60	
1	9.6857991	9.9417492	9.7440499	10.2559501	59	
2	9.6860267	9.9416791	9.7443476	10.2556524	58	
3	9.6862542	9.9416090	9.7446453	10.2553547	57	
4	9.6864816	9.9415388	9.7449428	10.2550572	56	
5	9.6867088	9.9414685	9.7452403	10.2547597	55	
6	9.6869359	9.9413982	9.7455376	10.2544624	54	
7	9.6871628	9.9413279	9.7458349	10.2541651	53	
8	9.6873895	9.9412575	9.7461320	10.2538680	52	
9	9.6876161	9.9411871	9.7464290	10.2535701	51	
10	9.6878425	9.9411166	9.7467259	10.2532741	50	
11	9.6880688	9.9410461	9.7470227	10.2529773	49	
12	9.6882949	9.9409755	9.7473194	10.2526806	48	
13	9.6885209	9.9409048	9.7476160	10.2523840	47	
14	9.6887467	9.9408342	9.7479125	10.2520875	46	
15	9.6889723	9.9407634	9.7482089	10.2517911	45	
16	9.6891978	9.9406927	9.7485052	10.2514948	44	
17	9.6894232	9.9406219	9.7488013	10.2511987	43	
18	9.6896484	9.9405510	9.7490974	10.2509026	42	
19	9.6898734	9.9404801	9.7493934	10.2506066	41	
20	9.6900983	9.9404091	9.7496892	10.2503108	40	
21	9.6903231	9.9403381	9.7499850	10.2500150	39	
22	9.6905476	9.9402670	9.7502806	10.2497194	38	
23	9.6907721	9.9401959	9.7505762	10.2494238	37	
24	9.6909964	9.9401248	9.7508716	10.2491284	36	
25	9.6912205	9.9400535	9.7511669	10.2488331	35	
26	9.6914445	9.9399823	9.7514622	10.2485378	34	
27	9.6916683	9.9399110	9.7517573	10.2482427	33	
28	9.6918919	9.9398396	9.7520523	10.2479477	32	
29	9.6921155	9.9397682	9.7523472	10.2476528	31	
30	9.6923388	9.9396968	9.7526420	10.2473580	30	
	Sine Complement	Sine	Tangent Complement	Tang.		
60 Degrees.						Minutes

29 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement.	Minutes
30	9.6923388	9.9396968	9.7526420	10.2473580	30
31	9.6925620	9.9396253	9.7529368	10.2470632	29
32	9.6927851	9.9395537	9.7532314	10.2467686	28
33	9.6930080	9.9394821	9.7535259	10.2464741	27
34	9.6932308	9.9394105	9.7538203	10.2461797	26
35	9.6934534	9.9393388	9.7541146	10.2458854	25
36	9.6936758	9.9392671	9.7544088	10.2455912	24
37	9.6938981	9.9391953	9.7547029	10.2452971	23
38	9.6941203	9.9391234	9.7549969	10.2450031	22
39	9.6943423	9.9390515	9.7552908	10.2447092	21
40	9.6945642	9.9389796	9.7555846	10.2444154	20
41	9.6947859	9.9389076	9.7558783	10.2441217	19
42	9.6950074	9.9388356	9.7561718	10.2438282	18
43	9.6952288	9.9387635	9.7564653	10.2435347	17
44	9.6954501	9.9386914	9.7567587	10.2432413	16
45	9.6956712	9.9386192	9.7570520	10.2429480	15
46	9.6958922	9.9385470	9.7573452	10.2426548	14
47	9.6961130	9.9384747	9.7576383	10.2423617	13
48	9.6963336	9.9384024	9.7579313	10.2420687	12
49	9.6965541	9.9383300	9.7582242	10.2417758	11
50	9.6967745	9.9382576	9.7585170	10.2414830	10
51	9.6969947	9.9381851	9.7588096	10.2411904	9
52	9.6972148	9.9381126	9.7591022	10.2408978	8
53	9.6974347	9.9380400	9.7593947	10.2406053	7
54	9.6976545	9.9379674	9.7596871	10.2403129	6
55	9.6978741	9.9378947	9.7599704	10.2400206	5
56	9.6980936	9.9378220	9.7602716	10.2397284	4
57	9.6983129	9.9377492	9.7605637	10.2394363	3
58	9.6985321	9.9376764	9.7608557	10.2391443	2
59	9.6987511	9.9376035	9.7611476	10.2388524	1
60	9.6989700	9.9375306	9.7614394	10.2385606	0
	Sine Complement	Sine	Tangent Complement.	Tang.	Minutes

60 Degrees.

30 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.6989700	9.9375306	9.7614394	10.2385606	30
1	9.6991887	9.9374577	9.7617311	10.2382689	31
2	9.6994073	9.9373847	9.7620227	10.2379773	32
3	9.6996258	9.9373116	9.7623142	10.2376858	33
4	9.6998441	9.9372385	9.7626056	10.2373944	34
5	9.7000622	9.9371653	9.7628969	10.2371031	35
6	9.7002802	9.9370921	9.7631881	10.2368119	36
7	9.7004981	9.9370189	9.7634792	10.2365208	37
8	9.7007158	9.9369456	9.7637702	10.2362298	38
9	9.7009334	9.9368722	9.7640612	10.2359388	39
10	9.7011508	9.9367988	9.7643520	10.2356480	40
11	9.7013681	9.9367254	9.7646427	10.2353573	41
12	9.7015852	9.9366519	9.7649334	10.2350666	42
13	9.7018022	9.9365783	9.7652239	10.2347761	43
14	9.7020190	9.9365047	9.7655143	10.2344857	44
15	9.7022357	9.9364311	9.7658047	10.2341953	45
16	9.7024523	9.9363574	9.7660949	10.2339051	46
17	9.7026687	9.9362836	9.7663851	10.2336149	47
18	9.7028849	9.9362098	9.7666751	10.2333249	48
19	9.7031011	9.9361360	9.7669651	10.2330349	49
20	9.7033170	9.9360621	9.7672550	10.2327450	50
21	9.7035329	9.9359881	9.7675448	10.2324552	51
22	9.7037486	9.9359141	9.7678344	10.2321656	52
23	9.7039641	9.9358401	9.7681240	10.2318760	53
24	9.7041795	9.9357660	9.7684135	10.2315865	54
25	9.7043947	9.9356918	9.7687029	10.2312971	55
26	9.7046099	9.9356177	9.7689922	10.2310078	56
27	9.7048248	9.9355434	9.7692814	10.2307186	57
28	9.7050397	9.9354691	9.7695705	10.2304295	58
29	9.7052548	9.9353948	9.7698596	10.2301404	59
30	9.7054689	9.9353204	9.7701485	10.2298515	60
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

59 Degrees.

30 Degrees.

Minutes	Sine		Tang.		Minutes
	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.7054689	9.9353204	9.7701485	10.2298515	30
31	9.7053683	9.9352459	9.7704373	10.2295627	29
32	9.7052985	9.9351715	9.7707261	10.2292739	28
33	9.7051116	9.9350969	9.7710147	10.2289853	27
34	9.7063256	9.9350223	9.7713033	10.2286967	26
35	9.7065394	9.9349477	9.7715917	10.2284083	25
36	9.7067531	9.9348730	9.7718801	10.2281199	24
37	9.7069667	9.9347983	9.7721684	10.2278316	23
38	9.7071801	9.9347235	9.7724566	10.2275434	22
39	9.7073933	9.9346486	9.7727447	10.2272553	21
40	9.7076064	9.9345738	9.7730327	10.2269673	20
41	9.7078194	9.9344988	9.7733206	10.2266794	19
42	9.7080323	9.9344238	9.7736084	10.2263916	18
43	9.7082450	9.9343488	9.7738961	10.2261039	17
44	9.7084575	9.9342737	9.7741838	10.2258162	16
45	9.7086699	9.9341986	9.7744713	10.2255287	15
46	9.7088822	9.9341234	9.7747588	10.2252412	14
47	9.7090943	9.9340483	9.7750462	10.2249538	13
48	9.7093063	9.9339729	9.7753334	10.2246666	12
49	9.7095182	9.9338976	9.7756206	10.2243794	11
50	9.7097299	9.9338222	9.7759077	10.2240923	10
51	9.7099415	9.9337467	9.7761947	10.2238053	9
52	9.7101529	9.9336713	9.7764816	10.2235184	8
53	9.7103642	9.9335957	9.7767685	10.2232315	7
54	9.7105753	9.9335201	9.7770552	10.2229448	6
55	9.7107863	9.9334445	9.7773418	10.2226582	5
56	9.7109972	9.9333688	9.7776284	10.2223716	4
57	9.7112080	9.9332931	9.7779149	10.2220851	3
58	9.7114186	9.9332173	9.7782012	10.2217988	2
59	9.7116290	9.9331415	9.7784875	10.2215125	1
60	9.7118393	9.9330656	9.7787737	10.2212263	0
Minutes	Sine		Tang.		Minutes
	Sine Complement	Sine	Tangent Complement	Tang.	

59 Degrees.

31 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.7118393	9.9330656	9.7787737	10.2212263	50
1	9.7120495	9.9329897	9.7790599	10.2209401	59
2	9.7122596	9.9329137	9.7793459	10.2206541	58
3	9.7124695	9.9328376	9.7796318	10.2203682	57
4	9.7126792	9.9327616	9.7799177	10.2200823	56
5	9.7128889	9.9326854	9.7802034	10.2197966	55
6	9.7130983	9.9326092	9.7804891	10.2195109	54
7	9.7133077	9.9325330	9.7807747	10.2192253	53
8	9.7135169	9.9324567	9.7810602	10.2189398	52
9	9.7137260	9.9323804	9.7813456	10.2186544	51
10	9.7139349	9.9323040	9.7816309	10.2183691	50
11	9.7141437	9.9322276	9.7819162	10.2180838	49
12	9.7143524	9.9321511	9.7822013	10.2177987	48
13	9.7145609	9.9320746	9.7824864	10.2175136	47
14	9.7147693	9.9319980	9.7827713	10.2172287	46
15	9.7149776	9.9319213	9.7830562	10.2169438	45
16	9.7151857	9.9318447	9.7833410	10.2166590	44
17	9.7153937	9.9317679	9.7836258	10.2163742	43
18	9.7156015	9.9316911	9.7839104	10.2160896	42
19	9.7158092	9.9316143	9.7841949	10.2158051	41
20	9.7160168	9.9315374	9.7844794	10.2155206	40
21	9.7162243	9.9314605	9.7847638	10.2152362	39
22	9.7164316	9.9313835	9.7850481	10.2149519	38
23	9.7166387	9.9313065	9.7853323	10.2146677	37
24	9.7168458	9.9312294	9.7856164	10.2143836	36
25	9.7170526	9.9311522	9.7859004	10.2140996	35
26	9.7172594	9.9310750	9.7861844	10.2138156	34
27	9.7174660	9.9309978	9.7864682	10.2135318	33
28	9.7176725	9.9309205	9.7867520	10.2132480	32
29	9.7178789	9.9308432	9.7870357	10.2129643	31
30	9.7180851	9.9307658	9.7873193	10.2126807	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

58 Degrees.

31 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangents Complement	
30	9.7180851	9.9307658	9.78723193	10.2126807	30
31	9.7182919	9.9306883	9.7876028	10.2123972	29
32	9.7184971	9.9306109	9.7878863	10.2121137	28
33	9.7187030	9.9305333	9.7881696	10.2118304	27
34	9.7189086	9.9304557	9.7884529	10.2115471	26
35	9.7191142	9.9303781	9.7887361	10.2112639	25
36	9.7193196	9.9303004	9.7890192	10.2109808	24
37	9.7195249	9.9302226	9.7893023	10.2106977	23
38	9.7197300	9.9301448	9.7895852	10.2104148	22
39	9.7199350	9.9300670	9.7898681	10.2101319	21
40	9.7201399	9.9299891	9.7901508	10.2098492	20
41	9.7203447	9.9299112	9.7904335	10.2095665	19
42	9.7205493	9.9298332	9.7907161	10.2092835	18
43	9.7207538	9.9297551	9.7909987	10.2090013	17
44	9.7209581	9.9296770	9.7912811	10.2087189	16
45	9.7211623	9.9295973	9.7915635	10.2084365	15
46	9.7213664	9.9295207	9.7918458	10.2081542	14
47	9.7215704	9.9294424	9.7921280	10.2078720	13
48	9.7217742	9.9293641	9.7924101	10.2075899	12
49	9.7219779	9.9292857	9.7926921	10.2073079	11
50	9.7221814	9.9292073	9.7929741	10.2070259	10
51	9.7223848	9.9291289	9.7932560	10.2067440	9
52	9.7225881	9.9290504	9.7935378	10.2064622	8
53	9.7227913	9.9289718	9.7938195	10.2061805	7
54	9.7229943	9.9288932	9.7941011	10.2058989	6
55	9.7231972	9.9288145	9.7943827	10.2056173	5
56	9.7234000	9.9287358	9.7946641	10.2053359	4
57	9.7236026	9.9286571	9.7949455	10.2050545	3
58	9.7238051	9.9285783	9.7952268	10.2047732	2
59	9.7240075	9.9284994	9.7955081	10.2044919	1
60	9.7242097	9.9284205	9.7957892	10.2042108	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

38 Degrees.

E

32 Degrees.					
Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.7242097	9.9284205	9.7957892	10.2042108	60
1	9.7244118	9.9283415	9.7960703	10.2039297	59
2	9.7246138	9.9282625	9.7963513	10.2036487	58
3	9.7248156	9.9281834	9.7966322	10.2033678	57
4	9.7250174	9.9281043	9.7969130	10.2030870	56
5	9.7252189	9.9280251	9.7971938	10.2028062	55
6	9.7254204	9.9279459	9.7974745	10.2025255	54
7	9.7256217	9.9278666	9.7977551	10.2022449	53
8	9.7258229	9.9277873	9.7980356	10.2019644	52
9	9.7260240	9.9277079	9.7983160	10.2016840	51
10	9.7262249	9.9276285	9.7985964	10.2014036	50
11	9.7264257	9.9275490	9.7988767	10.2011233	49
12	9.7266264	9.9274695	9.7991569	10.2008431	48
13	9.7268269	9.9273899	9.7994370	10.2005630	47
14	9.7270273	9.9273103	9.7997170	10.2002830	46
15	9.7272276	9.9272306	9.7999970	10.2000030	45
16	9.7274278	9.9271509	9.8002769	10.1997231	44
17	9.7276278	9.9270711	9.8005567	10.1994433	43
18	9.7278277	9.9269913	9.8008365	10.1991635	42
19	9.7280275	9.9269114	9.8011161	10.1988839	41
20	9.7282271	9.9268314	9.8013957	10.1986043	40
21	9.7284267	9.9267514	9.8016752	10.1983248	39
22	9.7286260	9.9266714	9.8019546	10.1980454	38
23	9.7288253	9.9265913	9.8022340	10.1977660	37
24	9.7290244	9.9265112	9.8025133	10.1974867	36
25	9.7292234	9.9264310	9.8027925	10.1972075	35
26	9.7294223	9.9263507	9.8030716	10.1969284	34
27	9.7296211	9.9262704	9.8033506	10.1966494	33
28	9.7298197	9.9261901	9.8036296	10.1963704	32
29	9.7300182	9.9261096	9.8039085	10.1960915	31
30	9.7302165	9.9260292	9.8041873	10.1958127	30
Sine Complement		Sine	Tangent Complement	Tang.	Minutes
57 Degrees.					

32 Degrees

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.7302165	9.9260292	9.8041873	10.1958127	30
31	9.7304148	9.9259487	9.8044661	10.1955339	29
32	9.7306129	9.9258681	9.8047447	10.1952553	28
33	9.7308109	9.9257875	9.8050233	10.1949767	27
34	9.7310087	9.9257069	9.8053019	10.1946981	26
35	9.7312054	9.9256261	9.8055803	10.1944197	25
36	9.7314040	9.9255454	9.8058587	10.1941413	24
37	9.7316015	9.9254646	9.8061370	10.1938630	23
38	9.7317989	9.9253837	9.8064152	10.1935848	22
39	9.7319961	9.9253028	9.8066933	10.1933067	21
40	9.7321932	9.9252218	9.8069714	10.1930286	20
41	9.7323902	9.9251408	9.8072494	10.1927506	19
42	9.7325870	9.9250597	9.8075273	10.1924727	18
43	9.7327837	9.9249786	9.8078052	10.1921948	17
44	9.7329803	9.9248974	9.8080829	10.1919171	16
45	9.7331768	9.9248161	9.8083606	10.1916394	15
46	9.7333731	9.9247349	9.8086382	10.1913617	14
47	9.7335693	9.9246535	9.8089158	10.1910842	13
48	9.7337654	9.9245721	9.8091933	10.1908067	12
49	9.7339614	9.9244907	9.8094707	10.1905293	11
50	9.7341572	9.9244092	9.8097480	10.1902520	10
51	9.7343529	9.9243277	9.8100253	10.1899747	9
52	9.7345485	9.9242461	9.8103025	10.1896975	8
53	9.7347440	9.9241644	9.8105796	10.1894204	7
54	9.7349393	9.9240827	9.8108566	10.1891434	6
55	9.7351345	9.9240010	9.8111336	10.1888664	5
56	9.7353296	9.9239191	9.8114105	10.1885895	4
57	9.7355246	9.9238373	9.8116873	10.1883127	3
58	9.7357195	9.9237554	9.8119641	10.1880359	2
59	9.7359143	9.9236734	9.8122408	10.1877592	1
60	9.7361088	9.9235914	9.8125174	10.1874826	0
	Sine Corr. 64 cent	Sine	Tangent complement	Tang.	Minutes

57 Degrees

E 2

33 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
0	9.7361088	9.9235914	9.8125174	10.1874826	60
1	9.7363032	9.9235093	9.8127939	10.1872061	59
2	9.7364976	9.9234272	9.8130704	10.1869296	58
3	9.7366918	9.9233450	9.8133468	10.1866532	57
4	9.7368859	9.9232628	9.8136231	10.1863769	56
5	9.7370799	9.9231805	9.8138993	10.1861007	55
6	9.7372737	9.9230982	9.8141755	10.1858245	54
7	9.7374675	9.9230158	9.8144516	10.1855484	53
8	9.7376611	9.9229334	9.8147277	10.1852723	52
9	9.7378546	9.9228509	9.8150036	10.1849964	51
10	9.7380479	9.9227684	9.8152795	10.1847205	50
11	9.7382412	9.9226858	9.8155554	10.1844446	49
12	9.7384343	9.9226032	9.8158311	10.1841689	48
13	9.7386273	9.9225205	9.8161068	10.1838932	47
14	9.7388201	9.9224377	9.8163824	10.1836176	46
15	9.7390129	9.9223549	9.8166580	10.1833420	45
16	9.7392055	9.9222721	9.8169335	10.1830665	44
17	9.7393980	9.9221891	9.8172089	10.1827911	43
18	9.7395904	9.9221062	9.8174842	10.1825158	42
19	9.7397827	9.9220232	9.8177595	10.1822405	41
20	9.7399748	9.9219401	9.8180347	10.1819653	40
21	9.7401668	9.9218570	9.8183098	10.1816902	39
22	9.7403587	9.9217738	9.8185849	10.1814151	38
23	9.7405505	9.9216906	9.8188599	10.1811401	37
24	9.7407421	9.9216073	9.8191348	10.1808652	36
25	9.7409337	9.9215240	9.8194096	10.1805904	35
26	9.7411251	9.9214406	9.8196844	10.1803156	34
27	9.7413164	9.9213572	9.8199592	10.1800408	33
28	9.7415075	9.9212737	9.8202338	10.1797662	32
29	9.7416986	9.9211902	9.8205084	10.1794916	31
30	9.7418895	9.9211066	9.8207829	10.1792171	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

56 Degrees.

33 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.7418895	9.9211066	9.8207829	10.1792171	30
31	9.7420803	9.9210229	9.8210574	10.1789426	29
32	9.7422710	9.9209393	9.8213317	10.1786683	28
33	9.7424616	9.9208555	9.8216060	10.1783940	27
34	9.7426520	9.9207717	9.8218803	10.1781197	26
35	9.7428423	9.9206878	9.8221545	10.1778455	25
36	9.7430325	9.9206039	9.8224286	10.1775714	24
37	9.7432226	9.9205200	9.8227026	10.1772974	23
38	9.7434126	9.9204360	9.8229766	10.1770234	22
39	9.7436024	9.9203519	9.8232505	10.1767494	21
40	9.7437921	9.9202678	9.8235244	10.1764756	20
41	9.7439817	9.9201836	9.8237981	10.1762019	19
42	9.7441712	9.9200994	9.8240719	10.1759281	18
43	9.7443606	9.9200151	9.8243455	10.1756543	17
44	9.7445498	9.9199308	9.8246191	10.1753809	16
45	9.7447390	9.9198464	9.8248926	10.1751074	15
46	9.7449280	9.9197619	9.8251660	10.1748340	14
47	9.7451169	9.9196775	9.8254394	10.1745606	13
48	9.7453056	9.9195929	9.8257127	10.1742873	12
49	9.7454943	9.9195083	9.8259860	10.1740140	11
50	9.7456828	9.9194237	9.8262592	10.1737408	10
51	9.7458712	9.9193390	9.8265323	10.1734677	9
52	9.7460595	9.9192542	9.8268053	10.1731947	8
53	9.7462477	9.9191694	9.8270783	10.1729217	7
54	9.7464358	9.9190845	9.8273513	10.1726487	6
55	9.7466237	9.9189996	9.8276241	10.1723759	5
56	9.7468115	9.9189146	9.8278969	10.1721031	4
57	9.7469992	9.9188296	9.8281696	10.1718304	3
58	9.7471868	9.9187445	9.8284423	10.1715577	2
59	9.7473743	9.9186594	9.8287149	10.1712851	1
60	9.7475617	9.9185742	9.8289874	10.1710126	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

56 Degrees.

E 3

34 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.7475617	9.9185742	9.8289874	10.1710126	60
1	9.7477489	9.9184890	9.8292599	10.1707401	59
2	9.7479368	9.9184037	9.8295323	10.1704677	58
3	9.7481230	9.9183183	9.8298043	10.1701953	57
4	9.7483099	9.9182329	9.8300769	10.1699231	56
5	9.7484967	9.9181475	9.8303492	10.1696508	55
6	9.7486833	9.9180620	9.8306213	10.1693787	54
7	9.7488698	9.9179764	9.8308934	10.1691066	53
8	9.7490562	9.9178908	9.8311654	10.1688346	52
9	9.7492425	9.9178051	9.8314374	10.1685626	51
10	9.7494287	9.9177194	9.8317093	10.1682907	50
11	9.7496148	9.9176336	9.8319811	10.1680189	49
12	9.7498007	9.9175478	9.8322529	10.1677471	48
13	9.7499866	9.9174619	9.8325246	10.1674754	47
14	9.7501723	9.9173760	9.8327963	10.1672037	46
15	9.7503575	9.9172900	9.8330679	10.1669321	45
16	9.7505434	9.9172040	9.8333394	10.1666606	44
17	9.7507287	9.9171179	9.8336109	10.1663891	43
18	9.7509140	9.9170317	9.8338823	10.1661177	42
19	9.7510991	9.9169455	9.8341536	10.1658464	41
20	9.7512842	9.9168593	9.8344249	10.1655751	40
21	9.7514691	9.9167730	9.8346961	10.1653039	39
22	9.7516538	9.9166866	9.8349673	10.1650327	38
23	9.7518385	9.9166002	9.8352384	10.1647616	37
24	9.7520231	9.9165137	9.8355094	10.1644906	36
25	9.7522075	9.9164272	9.8357804	10.1642196	35
26	9.7523919	9.9163409	9.8360513	10.1639487	34
27	9.7525761	9.9162539	9.8363221	10.1636779	33
28	9.7527602	9.9161679	9.8365929	10.1634071	32
29	9.7529442	9.9160805	9.8368636	10.1631364	31
30	9.7531280	9.9159937	9.8371343	10.1628657	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

55 Degrees.

34 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.7531280	9.9159937	9.8371343	10.1628657	30
31	9.7533118	9.9159069	9.8374049	10.1625951	29
32	9.7534954	9.9158200	9.8376755	10.1623245	28
33	9.7536790	9.9157330	9.8379460	10.1620540	27
34	9.7538624	9.9156460	9.8382164	10.1617836	26
35	9.7540457	9.9155589	9.8384867	10.1615133	25
36	9.7542288	9.9154718	9.8387571	10.1612429	24
37	9.7544119	9.9153846	9.8390273	10.1609727	23
38	9.7545949	9.9152974	9.8392975	10.1607025	22
39	9.7547777	9.9152101	9.8395676	10.1604324	21
40	9.7549604	9.9151228	9.8398377	10.1601623	20
41	9.7551431	9.9150354	9.8401077	10.1598923	19
42	9.7553256	9.9149479	9.8403776	10.1596224	18
43	9.7555080	9.9148604	9.8406475	10.1593525	17
44	9.7556902	9.9147729	9.8409174	10.1590826	16
45	9.7558724	9.9146852	9.8411871	10.1588129	15
46	9.7560544	9.9145976	9.8414569	10.1585431	14
47	9.7562364	9.9145099	9.8417269	10.1582735	13
48	9.7564182	9.9144221	9.8419961	10.1580039	12
49	9.7565999	9.9143342	9.8422657	10.1577343	11
50	9.7567815	9.9142464	9.8425351	10.1574649	10
51	9.7569630	9.9141584	9.8428046	10.1571954	9
52	9.7571444	9.9140704	9.8430739	10.1569261	8
53	9.7573256	9.9139824	9.8433432	10.1566568	7
54	9.7575068	9.9138943	9.8436125	10.1563875	6
55	9.7576878	9.9138061	9.8438817	10.1561183	5
56	9.7578687	9.9137179	9.8441508	10.1558492	4
57	9.7580495	9.9136296	9.8444199	10.1555801	3
58	9.7582302	9.9135413	9.8446889	10.1553111	2
59	9.7584108	9.9134530	9.8449579	10.1550421	1
60	9.7585913	9.9133645	9.8452268	10.1547732	0
	Sine Complement	Sine	Tangent Complement	Tang.	

55 Degrees.

E 4

35 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.7585913	9.9133645	9.8452268	10.1547732	60
1	9.7587717	9.9132760	9.8454956	10.1545044	59
2	9.7589519	9.9131875	9.8457644	10.1542356	58
3	9.7591321	9.9130989	9.8460332	10.1539668	57
4	9.7593121	9.9130102	9.8463018	10.1536982	56
5	9.7594920	9.9129215	9.8465705	10.1534295	55
6	9.7596718	9.9128328	9.8468390	10.1531610	54
7	9.7598515	9.9127440	9.8471075	10.1528925	53
8	9.7600311	9.9126551	9.8473760	10.1526240	52
9	9.7602106	9.9125662	9.8476444	10.1523556	51
10	9.7603899	9.9124772	9.8479127	10.1520873	50
11	9.7605692	9.9123882	9.8481810	10.1518190	49
12	9.7607483	9.9122991	9.8484492	10.1515508	48
13	9.7609274	9.9122099	9.8487174	10.1512826	47
14	9.7611063	9.9121207	9.8489855	10.1510145	46
15	9.7612851	9.9120315	9.8492536	10.1507464	45
16	9.7614638	9.9119422	9.8495216	10.1504784	44
17	9.7616424	9.9118528	9.8497896	10.1502104	43
18	9.7618208	9.9117634	9.8500575	10.1499425	42
19	9.7619992	9.9116739	9.8503253	10.1496747	41
20	9.7621775	9.9115844	9.8505931	10.1494069	40
21	9.7623556	9.9114948	9.8508608	10.1491392	39
22	9.7625337	9.9114051	9.8511285	10.1488715	38
23	9.7627116	9.9113155	9.8513961	10.1486039	37
24	9.7628894	9.9112257	9.8516637	10.1483363	36
25	9.7630671	9.9111359	9.8519312	10.1480688	35
26	9.7632447	9.9110460	9.8521987	10.1478013	34
27	9.7634222	9.9109561	9.8524661	10.1475339	33
28	9.7635996	9.9108661	9.8527335	10.1472665	32
29	9.7637769	9.9107761	9.8530008	10.1469992	31
30	9.7639540	9.9106860	9.8532680	10.1467320	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

14 Degrees.

35 Degrees.

Minutes

	Sine	Sine Complement	Tang.	Tangent Complement.	
30	9.7639540	9.9106860	9.8532680	10.1467320	30
31	9.7641311	9.9105959	9.8533532	10.1464748	29
32	9.7643080	9.9105057	9.8538023	10.1461977	28
33	9.7644849	9.9104155	9.8540654	10.1459306	27
34	9.7646616	9.9103251	9.8543365	10.1456635	26
35	9.7648382	9.9102348	9.8546034	10.1453966	25
36	9.7650147	9.9101444	9.8548704	10.1451296	24
37	9.7651911	9.9100539	9.8551372	10.1448628	23
38	9.7653674	9.9099634	9.8554041	10.1445959	22
39	9.7655436	9.9098728	9.8556708	10.1443292	21
40	9.7657197	9.9097821	9.8559376	10.1440624	20
41	9.7658957	9.9096915	9.8562042	10.1437958	19
42	9.7660715	9.9096007	9.8564708	10.1435292	18
43	9.7662473	9.9095099	9.8567374	10.1432626	17
44	9.7664229	9.9094190	9.8570039	10.1429961	16
45	9.7665985	9.9093281	9.8572704	10.1427296	15
46	9.7667739	9.9092371	9.8575368	10.1424632	14
47	9.7669492	9.9091461	9.8578031	10.1421969	13
48	9.7671244	9.9090550	9.8580694	10.1419306	12
49	9.7672996	9.9089639	9.8583357	10.1416643	11
50	9.7674746	9.9088727	9.8586019	10.1413981	10
51	9.7676494	9.9087814	9.8588680	10.1411320	9
52	9.7678242	9.9086901	9.8591341	10.1408659	8
53	9.7679989	9.9085988	9.8594002	10.1405998	7
54	9.7681735	9.9085073	9.8596661	10.1403339	6
55	9.7683480	9.9084159	9.8599321	10.1400679	5
56	9.7685223	9.9083243	9.8601980	10.1398020	4
57	9.7686966	9.9082327	9.8604638	10.1395362	3
58	9.7688707	9.9081411	9.8607296	10.1392704	2
59	9.7690448	9.9080494	9.8609954	10.1390046	1
60	9.7692187	9.9079576	9.8612610	10.1387390	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

54 Degrees.

36 Degrees.

Minutes	Sine		Tang.	
	Sine	Sine Complement	Tangent	Tangent Complement
0	9.7692187	9.9079576	9.8612610	10.1387390
1	9.7693925	9.9078658	9.8613267	10.1384733
2	9.7695662	9.9077740	9.8617923	10.1382077
3	9.7697398	9.9076820	9.8620578	10.1379422
4	9.7699134	9.9075901	9.8623233	10.1376767
5	9.7700868	9.9074980	9.8625887	10.1374112
6	9.7702601	9.9074059	9.8628541	10.1371456
7	9.7704332	9.9073138	9.8631195	10.1368805
8	9.7706063	9.9072216	9.8633848	10.1366152
9	9.7707793	9.9071293	9.8636500	10.1363500
10	9.7709522	9.9070370	9.8639152	10.1360848
11	9.7711249	9.9069446	9.8641803	10.1358197
12	9.7712976	9.9068522	9.8644454	10.1355546
13	9.7714702	9.9067597	9.8647105	10.1352895
14	9.7716426	9.9066671	9.8649755	10.1350243
15	9.7718150	9.9065745	9.8652404	10.1347596
16	9.7719872	9.9064819	9.8655053	10.1344947
17	9.7721593	9.9063892	9.8657702	10.1342298
18	9.7723314	9.9062964	9.8660350	10.1339650
19	9.7725033	9.9062036	9.8662997	10.1337003
20	9.7726751	9.9061107	9.8665644	10.1334356
21	9.7728468	9.9060177	9.8668291	10.1331709
22	9.7730185	9.9059247	9.8670937	10.1329063
23	9.7731900	9.9058317	9.8673583	10.1326417
24	9.7733614	9.9057386	9.8676228	10.1323772
25	9.7735327	9.9056454	9.8678873	10.1321127
26	9.7737039	9.9055522	9.8681517	10.1318483
27	9.7738749	9.9054589	9.8684160	10.1315840
28	9.7740459	9.9053656	9.8686804	10.1313196
29	9.7742168	9.9052722	9.8689446	10.1310554
30	9.7743876	9.9051787	9.8692089	10.1307911
	Sine Complement	Sine	Tangent Complement	Tang.

33 Degrees.

- 36 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.7743876	9.9051787	9.8692082	10.1307911	30
31	9.7745583	9.9050852	9.8694731	10.1305269	29
32	9.7747288	9.9049916	9.8697372	10.1302628	28
33	9.7748993	9.9048980	9.8700013	10.1299987	27
34	9.7750697	9.9048043	9.8702653	10.1297347	26
35	9.7752399	9.9047106	9.8705293	10.1294707	25
36	9.7754101	9.9046168	9.8707933	10.1292067	24
37	9.7755801	9.9045230	9.8710572	10.1289428	23
38	9.7757501	9.9044291	9.8713210	10.1286790	22
39	9.7759199	9.9043351	9.8715848	10.1284152	21
40	9.7760897	9.9042411	9.8718486	10.1281514	20
41	9.7762593	9.9041470	9.8721123	10.1278877	19
42	9.7764289	9.9040529	9.8723760	10.1276240	18
43	9.7765983	9.9039587	9.8726396	10.1273604	17
44	9.7767676	9.9038644	9.8729032	10.1270968	16
45	9.7769369	9.9037701	9.8731668	10.1268332	15
46	9.7771060	9.9036757	9.8734302	10.1265698	14
47	9.7772750	9.9035813	9.8736937	10.1263063	13
48	9.7774439	9.9034868	9.8739571	10.1260429	12
49	9.7776128	9.9033923	9.8742204	10.1257796	11
50	9.7777815	9.9032977	9.8744838	10.1255162	10
51	9.7779501	9.9032031	9.8747470	10.1252530	9
52	9.7781186	9.9031084	9.8750102	10.1249898	8
53	9.7782870	9.9030136	9.8752734	10.1247266	7
54	9.7784553	9.9029188	9.8755365	10.1244635	6
55	9.7786235	9.9028239	9.8757996	10.1242004	5
56	9.7787916	9.9027289	9.8760627	10.1239373	4
57	9.7789596	9.9026339	9.8763257	10.1236743	3
58	9.7791275	9.9025389	9.8765886	10.1234114	2
59	9.7792953	9.9024438	9.8768515	10.1231485	1
60	9.7794630	9.9023486	9.8771144	10.1228856	0
	Sine Complement	Sine	Tangent Complement	Tang.	

53 Degrees.

37 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.7794630	9.9023486	9.8771144	10.1228856	50
1	9.7796306	9.9022534	9.8773772	10.1226228	59
2	9.7797981	9.9021581	9.8776400	10.1223600	58
3	9.7799655	9.9020628	9.8779027	10.1220973	57
4	9.7801328	9.9019674	9.8781654	10.1218346	56
5	9.7803000	9.9018719	9.8784281	10.1215719	55
6	9.7804671	9.9017764	9.8786907	10.121309	54
7	9.7806341	9.9016808	9.8789533	10.1210467	53
8	9.7808010	9.9015852	9.8792158	10.1207842	52
9	9.7809677	9.9014895	9.8794782	10.1205218	51
10	9.7811344	9.9013938	9.8797407	10.1202593	50
11	9.7813010	9.9012980	9.8800031	10.1199969	49
12	9.7814675	9.9012021	9.8802654	10.1197346	48
13	9.7816339	9.9011062	9.8805277	10.1194723	47
14	9.7818002	9.9010102	9.8807900	10.1192100	46
15	9.7819664	9.9009142	9.8810522	10.1189478	45
16	9.7821324	9.9008181	9.8813144	10.1186856	44
17	9.7822984	9.9007219	9.8815765	10.1184235	43
18	9.7824643	9.9006257	9.8818386	10.1181614	42
19	9.7826301	9.9005294	9.8821007	10.1178993	41
20	9.7827958	9.9004331	9.8823627	10.1176373	40
21	9.7829614	9.9003367	9.8826246	10.1173754	39
22	9.7831268	9.9002403	9.8828866	10.1171134	38
23	9.7832922	9.9001438	9.8831484	10.1168516	37
24	9.7834575	9.9000472	9.8834103	10.1165897	36
25	9.7836227	9.8999506	9.8836721	10.1163279	35
26	9.7837878	9.8998539	9.8839338	10.1160662	34
27	9.7839528	9.8997572	9.8841956	10.1158044	33
28	9.7841177	9.8996604	9.8844572	10.1155428	32
29	9.7842824	9.8995636	9.8847189	10.1152811	31
30	9.7844471	9.8994667	9.8849805	10.1150195	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

52 Degrees.

37 Degrees.

Minutes	Sine	⁹⁰ Complement	Tang.	⁹⁰ Tangent Complement	Minutes
30	9.7844471	9.8994667	9.8849805	10.1150195	30
31	9.7846117	9.8993697	9.8852420	10.1147580	29
32	9.7847762	9.8992727	9.8855035	10.1144965	28
33	9.7849406	9.8991756	9.8857650	10.1142350	27
34	9.7851049	9.8990784	9.8860264	10.1139736	26
35	9.7852691	9.8989812	9.8862878	10.1137122	25
36	9.7854332	9.8988840	9.8865492	10.1134508	24
37	9.7855972	9.8987867	9.8868105	10.1131895	23
38	9.7857611	9.8986893	9.8870718	10.1129282	22
39	9.7859249	9.8985919	9.8873330	10.1126670	21
40	9.7860886	9.8984944	9.8875942	10.1124058	20
41	9.7862522	9.8983968	9.8878554	10.1121446	19
42	9.7864157	9.8982992	9.8881165	10.1118835	18
43	9.7865791	9.8982015	9.8883775	10.1116225	17
44	9.7867424	9.8981038	9.8886386	10.1113614	16
45	9.7869056	9.8980060	9.8888996	10.1111004	15
46	9.7870687	9.8979082	9.8891605	10.1108395	14
47	9.7872317	9.8978103	9.8894214	10.1105786	13
48	9.7873946	9.8977123	9.8896823	10.1103177	12
49	9.7875574	9.8976143	9.8899432	10.1100568	11
50	9.7877202	9.8975162	9.8902040	10.1097960	10
51	9.7878828	9.8974181	9.8904647	10.1095353	9
52	9.7880453	9.8973199	9.8907254	10.1092746	8
53	9.7882077	9.8972216	9.8909861	10.1090139	7
54	9.7883701	9.8971233	9.8912468	10.1087532	6
55	9.7885323	9.8970249	9.8915074	10.1084926	5
56	9.7886944	9.8969265	9.8917679	10.1082321	4
57	9.7888565	9.8968280	9.8920285	10.1079715	3
58	9.7890184	9.8967294	9.8922890	10.1077110	2
59	9.7891802	9.8966308	9.8925494	10.1074506	1
60	9.7893420	9.8965321	9.8928098	10.1071902	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

52 Degrees.

38 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
0	9.7893420	9.8965321	9.8928098	10.1071902	50
1	9.7895036	9.8964334	9.8930702	10.1069298	59
2	9.7896652	9.8963346	9.8933306	10.1066694	58
3	9.7898268	9.8962358	9.8935909	10.1064091	57
4	9.7899880	9.8961369	9.8938511	10.1061489	56
5	9.7901493	9.8960379	9.8941114	10.1058886	55
6	9.7903104	9.8959389	9.8943715	10.1056285	54
7	9.7904715	9.8958398	9.8946317	10.1053683	53
8	9.7906325	9.8957406	9.8948918	10.1051082	52
9	9.7907933	9.8956414	9.8951519	10.1048481	51
10	9.7909541	9.8955422	9.8954119	10.1045881	50
11	9.7911148	9.8954429	9.8956719	10.1043281	49
12	9.7912754	9.8953435	9.8959319	10.1040681	48
13	9.7914359	9.8952440	9.8961918	10.1038082	47
14	9.7915963	9.8951445	9.8964517	10.1035483	46
15	9.7917566	9.8950450	9.8967116	10.1032884	45
16	9.7919168	9.8949453	9.8969714	10.1030286	44
17	9.7920769	9.8948457	9.8972312	10.1027688	43
18	9.7922369	9.8947459	9.8974910	10.1025090	42
19	9.7923968	9.8946461	9.8977507	10.1022493	41
20	9.7925566	9.8945463	9.8980104	10.1019896	40
21	9.7927163	9.8944463	9.8982700	10.1017300	39
22	9.7928760	9.8943464	9.8985296	10.1014704	38
23	9.7930355	9.8942463	9.8987892	10.1012108	37
24	9.7931949	9.8941462	9.8990487	10.1009513	36
25	9.7933543	9.8940461	9.8993082	10.1006918	35
26	9.7935135	9.8939458	9.8995677	10.1004323	34
27	9.7936727	9.8938456	9.8998271	10.1001729	33
28	9.7938317	9.8937452	9.9000865	10.0999135	32
29	9.7939907	9.8936448	9.9003459	10.0996541	31
30	9.7941496	9.8935444	9.9006052	10.0993948	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

51 Degrees.

38 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.7941496	9.8935444	9.9005052	10.0993948	30
31	9.7943083	9.8934439	9.9008645	10.0991355	29
32	9.7944670	9.8933433	9.9011237	10.0988763	28
33	9.7946256	9.8932426	9.9013830	10.0986170	27
34	9.7947841	9.8931419	9.9016422	10.0983578	26
35	9.7949425	9.8930412	9.9019012	10.0980987	25
36	9.7951008	9.8929404	9.9021604	10.0978396	24
37	9.7952590	9.8928395	9.9024195	10.0975805	23
38	9.7954171	9.8927385	9.9026786	10.0973214	22
39	9.7955751	9.8926375	9.9029376	10.0970624	21
40	9.7957330	9.8925365	9.9031966	10.0968034	20
41	9.7958909	9.8924354	9.9034555	10.0965445	19
42	9.7960486	9.8923342	9.9037144	10.0962856	18
43	9.7962062	9.8922329	9.9039733	10.0960267	17
44	9.7963638	9.8921316	9.9042321	10.0957679	16
45	9.7965212	9.8920303	9.9044910	10.0955090	15
46	9.7966786	9.8919289	9.9047497	10.0952503	14
47	9.7968359	9.8918274	9.9050085	10.0949915	13
48	9.7969930	9.8917258	9.9052672	10.0947328	12
49	9.7971501	9.8916242	9.9055259	10.0944741	11
50	9.7973071	9.8915226	9.9057845	10.0942155	10
51	9.7974640	9.8914208	9.9060431	10.0939569	9
52	9.7976208	9.8913191	9.9063017	10.0936983	8
53	9.7977775	9.8912172	9.9065603	10.0934397	7
54	9.7979241	9.8911153	9.9068188	10.0931812	6
55	9.7980906	9.8910133	9.9070773	10.0929227	5
56	9.7982470	9.8909113	9.9073357	10.0926643	4
57	9.7984034	9.8908092	9.9075941	10.0924059	3
58	9.7985596	9.8907071	9.9078525	10.0921475	2
59	9.7987158	9.8906049	9.9081109	10.0918891	1
60	9.7988718	9.8905026	9.9083692	10.0916308	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

51 Degrees.

39 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
	Sine Complement	Sine	Tangent Complement	Tang.	
0	9.7988718	9.8905926	9.9083692	10.0916308	50
1	9.7990278	9.8904003	9.9086275	10.0913725	59
2	9.7991836	9.8902979	9.9088858	10.0911142	58
3	9.7993394	9.8901954	9.9091440	10.0908560	57
4	9.7994951	9.8900929	9.9094022	10.0905978	56
5	9.7996507	9.8899903	9.9096603	10.0903397	55
6	9.7998062	9.8898877	9.9099185	10.0900815	54
7	9.7999616	9.8897850	9.9101766	10.0898234	53
8	9.8001169	9.8896822	9.9104347	10.0895653	52
9	9.8002721	9.8895794	9.9106927	10.0893073	51
10	9.8004272	9.8894765	9.9109507	10.0890493	50
11	9.8005823	9.8893736	9.9112087	10.0887913	49
12	9.8007372	9.8892706	9.9114666	10.0885334	48
13	9.8008921	9.8891675	9.9117245	10.0882755	47
14	9.8010468	9.8890644	9.9119824	10.0880176	46
15	9.8012015	9.8889612	9.9122403	10.0877597	45
16	9.8013561	9.8888580	9.9124981	10.0875019	44
17	9.8015106	9.8887547	9.9127559	10.0872441	43
18	9.8016649	9.8886513	9.9130137	10.0869863	42
19	9.8018192	9.8885479	9.9132714	10.0867286	41
20	9.8019735	9.8884444	9.9135291	10.0864709	40
21	9.8021276	9.8883408	9.9137868	10.0862132	39
22	9.8022816	9.8882372	9.9140444	10.0859556	38
23	9.8024355	9.8881335	9.9143020	10.0856980	37
24	9.8025894	9.8880298	9.9145596	10.0854404	36
25	9.8027431	9.8879260	9.9148171	10.0851829	35
26	9.8028968	9.8878221	9.9150747	10.0849253	34
27	9.8030504	9.8877182	9.9153322	10.0846678	33
28	9.8032038	9.8876142	9.9155896	10.0844104	32
29	9.8033572	9.8875103	9.9158471	10.0841529	31
30	9.8035105	9.8874061	9.9161045	10.0838955	30
	Sine Complement	Sine	Tangent Complement	Tang.	

50 Degrees.

39 Degrees

Minutes	39 Degrees				Minutes
	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.8035105	9.8874061	9.9161045	10.0838955	30
31	9.8036637	9.8873019	9.9163618	10.0836382	29
32	9.8038168	9.8871977	9.9166192	10.0833808	28
33	9.8039699	9.8870934	9.9168765	10.0831235	27
34	9.8041228	9.8869890	9.9171338	10.0828662	26
35	9.8042757	9.8868846	9.9173911	10.0826089	25
36	9.8044284	9.8867801	9.9176483	10.0823517	24
37	9.8045811	9.8866756	9.9179055	10.0820945	23
38	9.8047336	9.8865710	9.9181627	10.0818373	22
39	9.8048861	9.8864663	9.9184198	10.0815802	21
40	9.8050385	9.8863616	9.9186769	10.0813231	20
41	9.8051908	9.8862568	9.9189340	10.0810660	19
42	9.8053430	9.8861519	9.9191911	10.0808089	18
43	9.8054951	9.8860470	9.9194481	10.0805515	17
44	9.8056472	9.8859420	9.9197051	10.0802949	16
45	9.8057991	9.8858370	9.9199621	10.0800379	15
46	9.8059510	9.8857319	9.9202191	10.0797809	14
47	9.8061027	9.8856267	9.9204760	10.0795240	13
48	9.8062544	9.8855215	9.9207329	10.0792671	12
49	9.8064060	9.8854162	9.9209898	10.0790102	11
50	9.8065575	9.8853109	9.9212466	10.0787534	10
51	9.8067089	9.8852055	9.9215034	10.0784966	9
52	9.8068602	9.8851000	9.9217602	10.0782398	8
53	9.8070114	9.8849945	9.9220170	10.0779830	7
54	9.8071627	9.8848889	9.9222737	10.0777263	6
55	9.8073136	9.8847832	9.9225304	10.0774696	5
56	9.8074646	9.8846775	9.9227871	10.0772129	4
57	9.8076154	9.8845717	9.9230437	10.0769563	3
58	9.8077662	9.8844659	9.9233004	10.0766996	2
59	9.8079169	9.8843599	9.9235570	10.0764430	1
60	9.8080675	9.8842540	9.9238135	10.0761865	0
Sine Complement	Sine	Tangent Complement	Tang.	50 Degrees	
				F	

40 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.8080675	9.8842540	9.9238135	10.0761865	50
1	9.8082180	9.8841479	9.9240701	10.0759299	59
2	9.8083684	9.8840418	9.9243266	10.0756734	58
3	9.8085188	9.8839357	9.9245831	10.0754169	57
4	9.8086690	9.8838294	9.9248396	10.0751604	56
5	9.8088192	9.8837232	9.9250960	10.0749040	55
6	9.8089692	9.8836168	9.9253524	10.0746476	54
7	9.8091192	9.8835104	9.9256088	10.0743912	53
8	9.8092691	9.8834039	9.9258652	10.0741348	52
9	9.8094189	9.8832974	9.9261215	10.0738785	51
10	9.8095686	9.8831908	9.9263778	10.0736222	50
11	9.8097182	9.8830841	9.9266341	10.0733659	49
12	9.8098678	9.8829774	9.9268904	10.0731096	48
13	9.8100172	9.8828706	9.9271466	10.0728534	47
14	9.8101666	9.8827638	9.9274028	10.0725972	46
15	9.8103159	9.8826568	9.9276590	10.0723410	45
16	9.8104650	9.8825499	9.9279152	10.0720848	44
17	9.8106141	9.8824428	9.9281713	10.0718287	43
18	9.8107631	9.8823357	9.9284274	10.0715726	42
19	9.8109121	9.8822285	9.9286835	10.0713165	41
20	9.8110609	9.8821213	9.9289396	10.0710604	40
21	9.8112096	9.8820140	9.9291956	10.0708044	39
22	9.8113583	9.8819067	9.9294516	10.0705484	38
23	9.8115069	9.8817992	9.9297076	10.0702924	37
24	9.8116554	9.8816918	9.9299636	10.0700364	36
25	9.8118038	9.8815842	9.9302195	10.0697805	35
26	9.8119521	9.8814766	9.9304755	10.0695245	34
27	9.8121003	9.8813689	9.9307314	10.0692686	33
28	9.8122484	9.8812612	9.9309872	10.0690128	32
29	9.8123965	9.8811534	9.9312431	10.0687569	31
30	9.8125444	9.8810455	9.9314989	10.0685011	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

49 Degrees.

40 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.8125444	9.8810455	9.9314989	10.0685011	30
31	9.8126923	9.8809376	9.9317547	10.0682453	29
32	9.8128401	9.8808296	9.9320105	10.0679895	28
33	9.8129878	9.8807215	9.9322662	10.0677338	27
34	9.8131354	9.8806134	9.9325220	10.0674780	26
35	9.8132829	9.8805052	9.9327777	10.0672223	25
36	9.8134303	9.8803970	9.9330334	10.0669666	24
37	9.8135777	9.8802887	9.9332890	10.0667110	23
38	9.8137250	9.8801803	9.9335446	10.0664554	22
39	9.8138721	9.8800719	9.9338003	10.0661997	21
40	9.8140192	9.8799634	9.9340559	10.0659441	20
41	9.8141662	9.8798548	9.9343114	10.0656886	19
42	9.8143131	9.8797462	9.9345670	10.0654330	18
43	9.8144600	9.8796375	9.9348225	10.0651775	17
44	9.8146067	9.8795287	9.9350780	10.0649220	16
45	9.8147534	9.8794199	9.9353335	10.0646665	15
46	9.8148999	9.8793110	9.9355889	10.0644111	14
47	9.8150464	9.8792021	9.9358444	10.0641556	13
48	9.8151928	9.8790930	9.9360998	10.0639002	12
49	9.8153391	9.8789840	9.9363552	10.0636448	11
50	9.8154854	9.8788748	9.9366105	10.0633895	10
51	9.8156315	9.8787656	9.9368659	10.0631341	9
52	9.8157776	9.8786563	9.9371212	10.0628788	8
53	9.8159235	9.8785470	9.9373765	10.0626235	7
54	9.8160694	9.8784376	9.9376318	10.0623682	6
55	9.8162152	9.8783281	9.9378871	10.0621129	5
56	9.8163609	9.8782186	9.9381423	10.0618577	4
57	9.8165066	9.8781090	9.9383975	10.0616025	3
58	9.8166521	9.8779994	9.9386527	10.0613473	2
59	9.8167975	9.8778896	9.9389079	10.0610921	1
60	9.8169429	9.8777799	9.9391631	10.0608369	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

49 Degrees.

F 2

41 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement
0	9.8169429	9.8777799	9.9391631	10.0608369
1	9.8170882	9.8776700	9.9394182	10.0605818
2	9.8172334	9.8775601	9.9396733	10.0603267
3	9.8173785	9.8774501	9.9399284	10.0600716
4	9.8175235	9.8773401	9.9401835	10.0598165
5	9.8176685	9.8772300	9.9404385	10.0595615
6	9.8178133	9.8771198	9.9406936	10.0593064
7	9.8179581	9.8770096	9.9409486	10.0590514
8	9.8181028	9.8768993	9.9412036	10.0587964
9	9.8182474	9.8767889	9.9414585	10.0585415
10	9.8183919	9.8766785	9.9417135	10.0582865
11	9.8185364	9.8765680	9.9419684	10.0580316
12	9.8186807	9.8764574	9.9422233	10.0577767
13	9.8188250	9.8763468	9.9424782	10.0575218
14	9.8189692	9.8762361	9.9427331	10.0572669
15	9.8191133	9.8761253	9.9429879	10.0570121
16	9.8192573	9.8760145	9.9432428	10.0567572
17	9.8194012	9.8759036	9.9434976	10.0565024
18	9.8195450	9.8757927	9.9437524	10.0562476
19	9.8196888	9.8756816	9.9440072	10.0559928
20	9.8198325	9.8755706	9.9442619	10.0557381
21	9.8199761	9.8754594	9.9445166	10.0554834
22	9.8201196	9.8753482	9.9447714	10.0552286
23	9.8202630	9.8752369	9.9450261	10.0549739
24	9.8204063	9.8751256	9.9452807	10.0547153
25	9.8205496	9.8750142	9.9455354	10.0544606
26	9.8206927	9.8749027	9.9457900	10.0542100
27	9.8208358	9.8747912	9.9460447	10.0539553
28	9.8209788	9.8746795	9.9462993	10.0537007
29	9.8211217	9.8745679	9.9465539	10.0534461
30	9.8212646	9.8744561	9.9468084	10.0531916
	Sine Complement	Sine	Tangent Complement	Tang.

48 Degrees.

Minutes

41 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.8212646	9.8744561	9.9468084	10.0531916	30
31	9.8214073	9.8743443	9.9470630	10.0529370	29
32	9.8215500	9.8742325	9.9473175	10.0526825	28
33	9.8216926	9.8741205	9.9475720	10.0524280	27
34	9.8218351	9.8740085	9.9478265	10.0521735	26
35	9.8219775	9.8738965	9.9480810	10.0519190	25
36	9.8221198	9.8737844	9.9483355	10.0516645	24
37	9.8222621	9.8736722	9.9485899	10.0514101	23
38	9.8224042	9.8735599	9.9488443	10.0511557	22
39	9.8225463	9.8734476	9.9490987	10.0509013	21
40	9.8226883	9.8733352	9.9493531	10.0506469	20
41	9.8228302	9.8732227	9.9496075	10.0503925	19
42	9.8229721	9.8731102	9.9498619	10.0501381	18
43	9.8231138	9.8729976	9.9501162	10.0498838	17
44	9.8232555	9.8728849	9.9503705	10.0496295	16
45	9.8233971	9.8727722	9.9506248	10.0493752	15
46	9.8235386	9.8726594	9.9508791	10.0491209	14
47	9.8236800	9.8725466	9.9511334	10.0488666	13
48	9.8238213	9.8724337	9.9513876	10.0486124	12
49	9.8239626	9.8723207	9.9516419	10.0483581	11
50	9.8241037	9.8722076	9.9518961	10.0481039	10
51	9.8242448	9.8720945	9.9521503	10.0478497	9
52	9.8243858	9.8719813	9.9524045	10.0475955	8
53	9.8245267	9.8718681	9.9526587	10.0473413	7
54	9.8246676	9.8717548	9.9529128	10.0470872	6
55	9.8248083	9.8716414	9.9531670	10.0468330	5
56	9.8249490	9.8715279	9.9534211	10.0465780	4
57	9.8250896	9.8714144	9.9536752	10.0463248	3
58	9.8252301	9.8713008	9.9539293	10.0460707	2
59	9.8253705	9.8711872	9.9541834	10.0458166	1
60	9.8255109	9.8710735	9.9544374	10.0455626	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

48 Degrees .

F 3

42 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
09	8255109	9.8710735	9.9544374	10.0455626	50
19	8256512	9.8709597	9.9546915	10.0453085	59
29	8257913	9.8708458	9.9549455	10.0450545	58
39	8259314	9.8707319	9.9551995	10.0448005	57
49	8260715	9.8706179	9.9554535	10.0445465	56
59	8262114	9.8705039	9.9557075	10.0442925	55
69	8263512	9.8703898	9.9559615	10.0440385	54
79	8264910	9.8702756	9.9562154	10.0437846	53
89	8266307	9.8701613	9.9564694	10.0435306	52
99	8267703	9.8700470	9.9567233	10.0432767	51
109	8269098	9.8699326	9.9569772	10.0430228	50
119	8270493	9.8698182	9.9572311	10.0427689	49
129	8271887	9.8697037	9.9574850	10.0425150	48
139	8273279	9.8695891	9.9577389	10.0422611	47
149	8274671	9.8694744	9.9579927	10.0420073	46
159	8276063	9.8693597	9.9582465	10.0417535	45
169	8277453	9.8692449	9.9585004	10.0414996	44
179	8278843	9.8691301	9.9587542	10.0412458	43
189	8280231	9.8690152	9.9590080	10.0409920	42
199	8281619	9.8689002	9.9592618	10.0407382	41
209	8283006	9.8687851	9.9595155	10.0404845	40
219	8284393	9.8686700	9.9597693	10.0402307	39
229	8285778	9.8685548	9.9600230	10.0399770	38
239	8287163	9.8684396	9.9602767	10.0397233	37
249	8288547	9.8683242	9.9605305	10.0394695	36
259	8289930	9.8682088	9.9607842	10.0392158	35
269	8291312	9.8680934	9.9610378	10.0389622	34
279	8292694	9.8679779	9.9612915	10.0387085	33
289	8294075	9.8678623	9.9615452	10.0384548	32
299	8295454	9.8677466	9.9617988	10.0382012	31
309	8296833	9.8676309	9.9620525	10.0379475	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

47 Degrees.

42 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.8296833	9.8676309	9.9620525	10.0379175	30
31	9.8298212	9.8675151	9.9623061	10.0376939	29
32	9.8299589	9.8673992	9.9625597	10.0374403	28
33	9.8300966	9.8672833	9.9628133	10.0371867	27
34	9.8302342	9.8671673	9.9630669	10.0369331	26
35	9.8303717	9.8670512	9.9633204	10.0366796	25
36	9.8305091	9.8669351	9.9635740	10.0364260	24
37	9.8306464	9.8668189	9.9638275	10.0361725	23
38	9.8307837	9.8667026	9.9640811	10.0359189	22
39	9.8309209	9.8665863	9.9643346	10.0356654	21
40	9.8310580	9.8664699	9.9645881	10.0354119	20
41	9.8311950	9.8663534	9.9648416	10.0351584	19
42	9.8313320	9.8662369	9.9650951	10.0349049	18
43	9.8314688	9.8661203	9.9653486	10.0346514	17
44	9.8316056	9.8660036	9.9656020	10.0343980	16
45	9.8317423	9.8658868	9.9658555	10.0341445	15
46	9.8318789	9.8657700	9.9661089	10.0338911	14
47	9.8320155	9.8656531	9.9663623	10.0336377	13
48	9.8321519	9.8655362	9.9666157	10.0333843	12
49	9.8322883	9.8654192	9.9668692	10.0331308	11
50	9.8324246	9.8653021	9.9671225	10.0328775	10
51	9.8325609	9.8651849	9.9673759	10.0326241	9
52	9.8326970	9.8650677	9.9676293	10.0323707	8
53	9.8328331	9.8649504	9.9678827	10.0321173	7
54	9.8329691	9.8648331	9.9681360	10.0318640	6
55	9.8331050	9.8647156	9.9683893	10.0316107	5
56	9.8332408	9.8645981	9.9686427	10.0313573	4
57	9.8333766	9.8644801	9.9688960	10.0311040	3
58	9.8335122	9.8643629	9.9691493	10.0308507	2
59	9.8336478	9.8642452	9.9694026	10.0305974	1
60	9.8337833	9.8641275	9.9696559	10.0303441	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

47 Degrees.

F 4

43 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.8337833	9.8641275	9.9696559	10.0303441	60
1	9.8339188	9.8640096	9.9699091	10.0300909	59
2	9.8340541	9.8638917	9.9701621	10.0298376	58
3	9.8341894	9.8637737	9.9704157	10.0295843	57
4	9.8343246	9.8636557	9.9706689	10.0293311	56
5	9.8344597	9.8635376	9.9709221	10.0290779	55
6	9.8345948	9.8634194	9.9711754	10.0288246	54
7	9.8347297	9.8633011	9.9714286	10.0285714	53
8	9.8348646	9.8631828	9.9716818	10.0283182	52
9	9.8349994	9.8630644	9.9719350	10.0280650	51
10	9.8351341	9.8629460	9.9721882	10.0278118	50
11	9.8352688	9.8628274	9.9724413	10.0275587	49
12	9.8354033	9.8627088	9.9726945	10.0273055	48
13	9.8355378	9.8625902	9.9729477	10.0270523	47
14	9.8356722	9.8624714	9.9732008	10.0267992	46
15	9.8358066	9.8623526	9.9734539	10.0265461	45
16	9.8359408	9.8622338	9.9737071	10.0262929	44
17	9.8360750	9.8621148	9.9739602	10.0260398	43
18	9.8362091	9.8619958	9.9742133	10.0257867	42
19	9.8363431	9.8618767	9.9744664	10.0255336	41
20	9.8364771	9.8617576	9.9747195	10.0252805	40
21	9.8366109	9.8616383	9.9749726	10.0250274	39
22	9.8367447	9.8615190	9.9752257	10.0247743	38
23	9.8368784	9.8613997	9.9754787	10.0245213	37
24	9.8370121	9.8612803	9.9757318	10.0242682	36
25	9.8371456	9.8611608	9.9759849	10.0240151	35
26	9.8372791	9.8610412	9.9762379	10.0237621	34
27	9.8374125	9.8609215	9.9764909	10.0235091	33
28	9.8375458	9.8608018	9.9767440	10.0232560	32
29	9.8376790	9.8606821	9.9769970	10.0230030	31
30	9.8378122	9.8605622	9.9772500	10.0227500	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

46 Degrees.

43 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement.	Minutes
30	9.8378122	9.8605622	9.9772500	10.0227500	30
31	9.8379453	9.8604423	9.9775030	10.0224970	29
32	9.8380783	9.8603223	9.9777560	10.0222440	28
33	9.8382112	9.8602022	9.9780090	10.0219910	27
34	9.8383441	9.8600821	9.9782620	10.0217380	26
35	9.8384769	9.8599619	9.9785149	10.0214851	25
36	9.8386096	9.8598416	9.9787679	10.0212321	24
37	9.8387422	9.8597213	9.9790209	10.0209791	23
38	9.8388747	9.8596009	9.9792738	10.0207262	22
39	9.8390072	9.8594804	9.9795268	10.0204732	21
40	9.8391396	9.8593599	9.9797797	10.0202203	20
41	9.8392719	9.8592393	9.9800326	10.0199674	19
42	9.8394041	9.8591186	9.9802856	10.0197144	18
43	9.8395363	9.8589978	9.9805385	10.0194615	17
44	9.8396684	9.8588770	9.9807914	10.0192086	16
45	9.8398004	9.8587561	9.9810443	10.0189557	15
46	9.8399323	9.8586351	9.9812972	10.0187028	14
47	9.8400642	9.8585141	9.9815501	10.0184499	13
48	9.8401959	9.8583929	9.9818030	10.0181970	12
49	9.8403276	9.8582718	9.9820559	10.0179441	11
50	9.8404593	9.8581505	9.9823087	10.0176913	10
51	9.8405908	9.8580292	9.9825616	10.0174384	9
52	9.8407223	9.8579078	9.9828145	10.0171855	8
53	9.8408537	9.8577863	9.9830673	10.0169327	7
54	9.8409850	9.8576648	9.9833202	10.0166798	6
55	9.8411162	9.8575432	9.9835730	10.0164270	5
56	9.8412474	9.8574215	9.9838259	10.0161741	4
57	9.8413785	9.8572998	9.9840787	10.0159213	3
58	9.8415095	9.8571779	9.9843315	10.0156685	2
59	9.8416404	9.8570561	9.9845844	10.0154156	1
60	9.8417713	9.8569341	9.9848372	10.0151628	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

46 Degrees.

44 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.8417713	9.8569341	9.9848374	10.0151628	60
1	9.8419021	9.8568121	9.9850900	10.0145099	59
2	9.8420328	9.8566900	9.9853428	10.0146572	58
3	9.8421634	9.8565678	9.9855956	10.0144044	57
4	9.8422939	9.8564455	9.9858484	10.0141516	56
5	9.8424244	9.8563232	9.9861012	10.0138988	55
6	9.8425548	9.8562008	9.9863540	10.0136460	54
7	9.8426851	9.8560784	9.9866068	10.0133932	53
8	9.8428154	9.8559558	9.9868596	10.0131404	52
9	9.8429456	9.8558332	9.9871123	10.0128877	51
10	9.8430757	9.8557106	9.9873651	10.0126349	50
11	9.8432057	9.8555878	9.9876179	10.0123821	49
12	9.8433356	9.8554650	9.9878706	10.0121294	48
13	9.8434655	9.8553421	9.9881234	10.0118766	47
14	9.8435953	9.8552192	9.9883761	10.0116239	46
15	9.8437250	9.8550961	9.9886289	10.0113711	45
16	9.8438547	9.8549730	9.9888816	10.0111184	44
17	9.8439842	9.8548499	9.9891344	10.0108656	43
18	9.8441137	9.8547266	9.9893871	10.0106129	42
19	9.8442432	9.8546033	9.9896399	10.0103601	41
20	9.8443725	9.8544799	9.9898926	10.0101074	40
21	9.8445018	9.8543564	9.9901453	10.0098547	39
22	9.8446310	9.8542329	9.9903981	10.0096019	38
23	9.8447601	9.8541093	9.9906508	10.0093492	37
24	9.8448891	9.8539856	9.9909035	10.0090965	36
25	9.8450181	9.8538619	9.9911562	10.0088438	35
26	9.8451470	9.8537381	9.9914089	10.0085911	34
27	9.8452758	9.8536142	9.9916616	10.0083384	33
28	9.8454045	9.8534902	9.9919143	10.0080857	32
29	9.8455332	9.8533662	9.9921670	10.0078330	31
30	9.8456618	9.8532421	9.9924197	10.0075803	30
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

45 Degrees.

44 Degrees.

Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
30	9.8456618	9.8532421	9.9924197	10.0075803	30
31	9.8457903	9.8531179	9.9926724	10.0073276	29
32	9.8459188	9.8529936	9.9929251	10.0070749	28
33	9.8460471	9.8528693	9.9931778	10.0068222	27
34	9.8461754	9.8527449	9.9934305	10.0065695	26
35	9.8463036	9.8526204	9.9936832	10.0063168	25
36	9.8464318	9.8524959	9.9939359	10.0060641	24
37	9.8465599	9.8523713	9.9941886	10.0058114	23
38	9.8466879	9.8522466	9.9944413	10.0055587	22
39	9.8468158	9.8521218	9.9946940	10.0053060	21
40	9.8469436	9.8519970	9.9949466	10.0050534	20
41	9.8470714	9.8518721	9.9951993	10.0048007	19
42	9.8471994	9.8517471	9.9954520	10.0045480	18
43	9.8473267	9.8516220	9.9957047	10.0042953	17
44	9.8474543	9.8514969	9.9959573	10.0040427	16
45	9.8475817	9.8513717	9.9962100	10.0037900	15
46	9.8477091	9.8512465	9.9964627	10.0035373	14
47	9.8478365	9.8511211	9.9967154	10.0032846	13
48	9.8479637	9.8509957	9.9969680	10.0030320	12
49	9.8480909	9.8508702	9.9972207	10.0027793	11
50	9.8482180	9.8507446	9.9974734	10.0025266	10
51	9.8483450	9.8506190	9.9977260	10.0022740	9
52	9.8484720	9.8504933	9.9979787	10.0020213	8
53	9.8485989	9.8503675	9.9982314	10.0017686	7
54	9.8487257	9.8502417	9.9984840	10.0015160	6
55	9.8488524	9.8501157	9.9987367	10.0012632	5
56	9.8489791	9.8499897	9.9989893	10.0010107	4
57	9.8491057	9.8498637	9.9992420	10.0007580	3
58	9.8492322	9.8497375	9.9994947	10.0005053	2
59	9.8493586	9.8496113	9.9997473	10.0002527	1
60	9.8494850	9.8494850	10.0000000	10.0000000	0
	Sine Complement	Sine	Tangent Complement	Tang.	Minutes

45 Degrees.

26	9.8375458	9.8608010	9.9707440	10.0235500	34
29	9.8376790	9.8606821	9.9769970	10.0230030	31
30	9.8378122	9.8605622	9.9772500	10.0227500	30
Sine Complement		Sine	Tangent Complement	Tang.	Minutes
46 Degrees.					

44 Degrees.					
Minutes	Sine	Sine Complement	Tang.	Tangent Complement	Minutes
0	9.8417713	9.8569341	9.9848374	10.0151628	60
1	9.8419021	9.8568121	9.9850900	10.0145059	59
2	9.8420328	9.8566900	9.9853428	10.0140572	58
3	9.8421634	9.8565678	9.9855956	10.0144044	57
4	9.8422939	9.8564455	9.9858484	10.0141516	56
5	9.8424244	9.8563232	9.9861012	10.0138988	55
6	9.8425548	9.8562008	9.9863540	10.0136460	54
7	9.8426851	9.8560784	9.9866068	10.0133932	53
8	9.8428154	9.8559558	9.9868596	10.0131404	52
9	9.8429456	9.8558332	9.9871123	10.0128877	51
10	9.8430757	9.8557106	9.9873651	10.0126349	50
11	9.8432057	9.8555878	9.9876179	10.0123821	49
12	9.8433356	9.8554650	9.9878706	10.0121294	48
13	9.8434655	9.8553421	9.9881234	10.0118766	47
14	9.8435953	9.8552192	9.9883761	10.0116239	46
15	9.8437250	9.8550961	9.9886289	10.0113711	45
16	9.8438547	9.8549730	9.9888816	10.0111184	44
17	9.8439842	9.8548499	9.9891344	10.0108656	43
18	9.8441137	9.8547266	9.9893871	10.0106129	42
19	9.8442432	9.8546033	9.9896399	10.0103601	41
20	9.8443725	9.8544799	9.9898926	10.0101074	40
21	9.8445018	9.8543564	9.9901453	10.0098547	39
22	9.8446310	9.8542329	9.9903981	10.0096019	38
23	9.8447601	9.8541093	9.9906508	10.0093492	37
24	9.8448891	9.8539856	9.9909035	10.0090965	36
25	9.8450181	9.8538619	9.9911562	10.0088438	35
26	9.8451470	9.8537381	9.9914089	10.0085911	34
27	9.8452758	9.8536142	9.9916616	10.0083384	33
28	9.8454045	9.8534902	9.9919143	10.0080857	32
29	9.8455332	9.8533662	9.9921670	10.0078330	31
30	9.8456618	9.8532421	9.9924197	10.0075803	30
Sine Complement		Sine	Tangent Complement	Tang.	Minutes
45 Degrees.					

59	9.8416404	9.8570561	9.9845844	10.0154156	1
60	9.8417713	9.8569341	9.9848372	10.0151628	0
Sine Complement		Sine	Tangent Complement		Tangent
46 Degrees.					

44 Degrees.					
Minutes	Sine	Sine Complement	Tang.	Tangent Complement	
30	9.8456618	9.8532421	9.9924197	10.0075803	30
31	9.8457903	9.8531179	9.9926724	10.0073276	29
32	9.8459188	9.8529936	9.9929251	10.0070749	28
33	9.8460471	9.8528693	9.9931778	10.0068222	27
34	9.8461754	9.8527449	9.9934305	10.0065695	26
35	9.8463036	9.8526204	9.9936832	10.0063168	25
36	9.8464318	9.8524959	9.9939359	10.0060641	24
37	9.8465599	9.8523713	9.9941886	10.0058114	23
38	9.8466879	9.8522466	9.9944413	10.0055587	22
39	9.8468158	9.8521218	9.9946940	10.0053060	21
40	9.8469436	9.8519970	9.9949466	10.0050534	20
41	9.8470714	9.8518721	9.9951993	10.0048007	19
42	9.8471994	9.8517471	9.9954520	10.0045480	18
43	9.8473267	9.8516220	9.9957047	10.0042953	17
44	9.8474543	9.8514969	9.9959573	10.0040427	16
45	9.8475817	9.8513717	9.9962100	10.0037900	15
46	9.8477091	9.8512465	9.9964627	10.0035373	14
47	9.8478365	9.8511211	9.9967154	10.0032846	13
48	9.8479637	9.8509957	9.9969680	10.0030320	12
49	9.8480909	9.8508702	9.9972207	10.0027793	11
50	9.8482180	9.8507446	9.9974734	10.0025266	10
51	9.8483450	9.8506190	9.9977260	10.0022740	9
52	9.8484720	9.8504933	9.9979787	10.0020213	8
53	9.8485989	9.8503675	9.9982314	10.0017686	7
54	9.8487257	9.8502417	9.9984840	10.0015160	6
55	9.8488524	9.8501157	9.9987367	10.0012632	5
56	9.8489791	9.8499897	9.9989893	10.0010107	4
57	9.8491057	9.8498637	9.9992420	10.0007580	3
58	9.8492322	9.8497375	9.9994947	10.0005053	2
59	9.8493586	9.8496113	9.9997473	10.0002527	1
60	9.8494850	9.8494850	10.0000000	10.0000000	0
Sine Complement		Sine	Tangent Complement	Tang.	Minutes
45 Degrees.					

A
TABLE
OF

Logarithms

OF
Absolute Numbers,

From an Unite to 10000.

Num	Logarithm	Num	Logarithm	Num	Logarithm
10	0.0000000	34	1.5314789	67	1.8260748
20	0.3010300	35	1.5440680	68	1.8325089
30	0.4771212	36	1.5563025	69	1.8388491
40	0.6020600	37	1.5682017	70	1.8450980
50	0.6989700	38	1.5797836	71	1.8512583
60	0.7781512	39	1.5910646	72	1.8573325
70	0.8450980	40	1.6020600	73	1.8633229
80	0.9030900	41	1.6127839	74	1.8692317
90	0.9542425	42	1.6232493	75	1.8750613
100	1.0000000	43	1.6334685	76	1.8808136
110	1.0413927	44	1.6434527	77	1.8864907
120	1.0791812	45	1.6532125	78	1.8920946
130	1.1139433	46	1.6627578	79	1.8976271
140	1.1461280	47	1.6720979	80	1.9030900
150	1.1760913	48	1.6812412	81	1.9084850
160	1.2041200	49	1.6901961	82	1.9138138
170	1.2304489	50	1.6989700	83	1.9190781
180	1.2552725	51	1.7075702	84	1.9242793
190	1.2787536	52	1.7160033	85	1.9294185
200	1.3010300	53	1.7242759	86	1.9344984
210	1.3222193	54	1.7323938	87	1.9395195
220	1.3424227	55	1.7403627	88	1.9444827
230	1.3617278	56	1.7481880	89	1.9493900
240	1.3802112	57	1.7558748	90	1.9542425
250	1.3979400	58	1.7634280	91	1.9590414
260	1.4149733	59	1.7708520	92	1.9637878
270	1.4313638	60	1.7781512	93	1.9684825
280	1.4471580	61	1.7853298	94	1.9731278
290	1.4623980	62	1.7923917	95	1.9777236
300	1.4771212	63	1.7993405	96	1.9822712
310	1.4913617	64	1.8061800	97	1.9867717
320	1.5051500	65	1.8129133	98	1.9912261
330	1.5185139	66	1.8195439	99	1.9956355
340	1.5314789	67	1.8260748	100	2.0000000

Num	Logarithm	Num	Logarithm	Num	Logarithm
101	2.0043214	131	2.1271048	167	2.2227165
102	2.0086002	132	2.1303333	168	2.2253093
103	2.0128372	133	2.1335389	169	2.2278867
104	2.0170333	134	2.1367206	170	2.2304485
105	2.0211893	135	2.1398791	171	2.2329961
106	2.0253059	136	2.1430148	172	2.2355284
107	2.0293838	137	2.1461280	173	2.2380461
108	2.0334238	138	2.1492191	174	2.2405492
109	2.0374265	139	2.1522883	175	2.2430380
110	2.0413927	140	2.1553360	176	2.2455127
111	2.0453230	141	2.1583625	177	2.2479735
112	2.0492180	142	2.1613680	178	2.2504200
113	2.0530784	143	2.1643528	179	2.2528530
114	2.0569048	144	2.1673173	180	2.2552725
115	2.0606978	145	2.1702617	181	2.2576786
116	2.0644580	146	2.1731863	182	2.2600714
117	2.0681859	147	2.1760913	183	2.2624511
118	2.0718820	148	2.1789769	184	2.2648178
119	2.0755470	149	2.1818436	185	2.2671717
120	2.0791812	150	2.1846914	186	2.2695129
121	2.0827854	151	2.1875207	187	2.2718416
122	2.0863598	152	2.1903317	188	2.2741578
123	2.0899051	153	2.1931246	189	2.2764618
124	2.0934217	154	2.1958996	190	2.2787536
125	2.0969100	155	2.1986571	191	2.2810334
126	2.1003705	156	2.2013971	192	2.2833012
127	2.1038037	157	2.2041200	193	2.2855575
128	2.1072100	158	2.2068259	194	2.2878017
129	2.1105897	159	2.2095150	195	2.2900346
130	2.1139433	160	2.2121876	196	2.2922561
131	2.1172713	161	2.2148438	197	2.2944652
132	2.1205739	162	2.2174839	198	2.2966652
133	2.1238516	163	2.2201081	199	2.2988531
134	2.1271048	164	2.2227165	200	2.3010300

Num	Logarithm	Num	Logarithm	Num	Logarithm
201	2.3031961	234	2.3692159	257	2.4265113
202	2.3053514	235	2.3710679	258	2.4281348
203	2.3074960	236	2.3729120	259	2.4297523
204	2.3096302	237	2.3747483	270	2.4313638
205	2.3117539	238	2.3765770	271	2.4329593
206	2.3138672	239	2.3783979	272	2.4345689
207	2.3159703	240	2.3802112	273	2.4361626
208	2.3180633	241	2.3820170	274	2.4377506
209	2.3201463	242	2.3838154	275	2.4393327
210	2.3222193	243	2.3856063	276	2.4409091
211	2.3242824	244	2.3873898	277	2.4424798
212	2.3263359	245	2.3891661	278	2.4440448
213	2.3283796	246	2.3909351	279	2.4456042
214	2.3304138	247	2.3926969	280	2.4471580
215	2.3324385	248	2.3944517	281	2.4487063
216	2.3344537	249	2.3961993	282	2.4502491
217	2.3364597	250	2.3979400	283	2.4517864
218	2.3384565	251	2.3996737	284	2.4533183
219	2.3404441	252	2.4014005	285	2.4548449
220	2.3424227	253	2.4031205	286	2.4563660
221	2.3443923	254	2.4048337	287	2.4578819
222	2.3463530	255	2.4065402	288	2.4593925
223	2.3483049	256	2.4082400	289	2.4608978
224	2.3502480	257	2.4099331	290	2.4623980
225	2.3521825	258	2.4116197	291	2.4638930
226	2.3541084	259	2.4132998	292	2.4653828
227	2.3560259	260	2.4149733	293	2.4668676
228	2.3579348	261	2.4166405	294	2.4683473
229	2.3598355	262	2.4183013	295	2.4698220
230	2.3617278	263	2.4199557	296	2.4712917
231	2.3636120	264	2.4216039	297	2.4727564
232	2.3654880	265	2.4232459	298	2.4742163
233	2.3673559	266	2.4248816	299	2.4756712
234	2.3692159	267	2.4265113	300	2.4771212

Num	Logarithm	Num	Logarithm	Num	Logarithm
301	2.4785663	334	2.5237465	367	2.5646661
302	2.4800069	335	2.5250448	368	2.5658478
303	2.4814426	336	2.5263393	369	2.5670264
304	2.4828736	337	2.5276299	370	2.5682017
305	2.4842998	338	2.5289167	371	2.5693735
306	2.4857214	339	2.5301997	372	2.5705425
307	2.4871384	340	2.5314789	373	2.5717088
308	2.4885507	341	2.5327544	374	2.5728716
309	2.4899585	342	2.5340261	375	2.5740312
310	2.4913617	343	2.5352941	376	2.5751878
311	2.4927604	344	2.5365584	377	2.5763413
312	2.4941546	345	2.5378191	378	2.5774918
313	2.4955443	346	2.5390761	379	2.5786392
314	2.4969296	347	2.5403295	380	2.5797836
315	2.4983105	348	2.5415792	381	2.5809250
316	2.4996871	349	2.5428254	382	2.5820634
317	2.5010593	350	2.5440680	383	2.5831988
318	2.5024271	351	2.5453071	384	2.5843312
319	2.5037907	352	2.5465427	385	2.5854607
320	2.5051500	353	2.5477747	386	2.5865875
321	2.5065050	354	2.5490033	387	2.5877110
322	2.5078559	355	2.5502283	388	2.5888317
323	2.5092025	356	2.5514500	389	2.5899496
324	2.5105450	357	2.5526682	390	2.5910646
325	2.5118834	358	2.5538820	391	2.5921768
326	2.5132176	359	2.5550944	392	2.5932861
327	2.5145477	360	2.5563025	393	2.5943925
328	2.5158738	361	2.5575072	394	2.5954962
329	2.5171959	362	2.5587086	395	2.5965971
330	2.5185139	363	2.5599066	396	2.5976952
331	2.5198280	364	2.5611014	397	2.5987905
332	2.5211381	365	2.5622929	398	2.5998832
333	2.5224442	366	2.5634811	399	2.6009725
334	2.5237465	367	2.5646661	400	2.6020600

Num Logarithm	Num Logarithm	Num Logarithm
401 2.6031444	434 2.7374897	467 2.6693169
402 2.6042260	435 2.6384893	468 2.6702458
403 2.6053050	436 2.6394865	469 2.6711728
404 2.6063814	437 2.6404814	470 2.6720979
405 2.6074550	438 2.6414741	471 2.6730209
406 2.6085260	439 2.6424645	472 2.6739420
407 2.5095944	440 2.6434527	473 2.6748611
408 2.6106602	441 2.6444386	474 2.6757783
409 2.6117233	442 2.6454223	475 2.6766936
410 2.6127839	443 2.6464037	476 2.6776069
411 2.6138418	444 2.6473830	477 2.6785184
412 2.6148972	445 2.6483600	478 2.6794279
413 2.6159500	446 2.6493349	479 2.6803355
414 2.6170003	447 2.6503075	480 2.6812412
415 2.6180481	448 2.6512780	481 2.6821451
416 2.6190933	449 2.6522463	482 2.6830470
417 2.6201360	450 2.6532125	483 2.6839471
418 2.6211763	451 2.6541765	484 2.6848454
419 2.6222140	452 2.6551384	485 2.6857417
420 2.6232493	453 2.6560982	486 2.6866363
421 2.6242821	454 2.6570558	487 2.6875290
422 2.6253124	455 2.6580114	488 2.6884198
423 2.6263404	456 2.6589648	489 2.6893089
424 2.6273659	457 2.6599162	490 2.6901961
425 2.6283889	458 2.6608655	491 2.6910815
426 2.6294096	459 2.6618127	492 2.6919651
427 2.6304279	460 2.6627578	493 2.6928469
428 2.6314438	461 2.6637009	494 2.6937269
429 2.6324573	462 2.6646420	495 2.6946052
430 2.6334685	463 2.6655810	496 2.6954817
431 2.6344773	464 2.6665180	497 2.6963564
432 2.6354837	465 2.6674529	498 2.6972293
433 2.6364879	466 2.6683859	499 2.6981005
434 2.6374897	467 2.6693169	500 2.6989700

Num Logarithm	Num Logarithm	Num Logarithm
501 2.6998377	534 2.7275413	567 2.7535831
502 2.7007037	535 2.7283538	568 2.7543483
503 2.7015680	536 2.7291648	569 2.7551123
504 2.7024305	537 2.7291648	570 2.7558748
505 2.7032914	538 2.7307823	571 2.7566361
506 2.7041505	539 2.7315888	572 2.7573960
507 2.7050080	540 2.7323938	573 2.7581546
508 2.7058637	541 2.7331973	574 2.7589119
509 2.7067178	542 2.7339993	575 2.7596678
510 2.7075702	543 2.7347998	576 2.7604225
511 2.7084209	544 2.7355989	577 2.7611758
512 2.7092700	545 2.7363965	578 2.7619278
513 2.7101174	546 2.7371926	579 2.7626786
514 2.7109631	547 2.7379873	580 2.7634280
515 2.7118072	548 2.7387806	581 2.7641761
516 2.7126497	549 2.7395723	582 2.7649230
517 2.7134905	550 2.7403627	583 2.7656685
518 2.7143298	551 2.7411516	584 2.7664128
519 2.7151674	552 2.7419391	585 2.7671559
520 2.7160033	553 2.7427251	586 2.7678976
521 2.7168377	554 2.7435098	587 2.7686381
522 2.7176705	555 2.7442930	588 2.7693773
523 2.7185017	556 2.7450748	589 2.7701153
524 2.7193313	557 2.7458552	590 2.7708520
525 2.7201593	558 2.7466342	591 2.7715875
526 2.7209857	559 2.7474118	592 2.7723217
527 2.7218106	560 2.7481880	593 2.7730547
528 2.7226339	561 2.7489629	594 2.7737864
529 2.7234557	562 2.7497363	595 2.7745170
530 2.7242759	563 2.7505084	596 2.7752463
531 2.7250945	564 2.7512791	597 2.7759743
532 2.7259116	565 2.7520484	598 2.7767012
533 2.7267272	566 2.7528164	599 2.7774268
534 2.7275413	567 2.7535831	600 2.7781512

Num	Logarithm	Num	Logarithm	Num	Logarithm
601	2.7788745	634	2.8020893	667	2.8241258
602	2.7795965	635	2.8027737	668	2.8247765
603	2.7803173	636	2.8034571	669	2.8254261
604	2.7810369	637	2.8041394	670	2.8260748
605	2.7817554	638	2.8048207	671	2.8267225
606	2.7824726	639	2.8055009	672	2.8273693
607	2.7831887	640	2.8061800	673	2.8280151
608	2.7839036	641	2.8068580	674	2.8286599
609	2.7846173	642	2.8075350	675	2.8293138
610	2.7853298	643	2.8082110	676	2.8299467
611	2.7860412	644	2.8088859	677	2.8305887
612	2.7867514	645	2.8095597	678	2.8312297
613	2.7874605	646	2.8102325	679	2.8318698
614	2.7881684	647	2.8109043	680	2.8325098
615	2.7888751	648	2.8115750	681	2.8331471
616	2.7895807	649	2.8122447	682	2.8337844
617	2.7902852	650	2.8129134	683	2.8344207
618	2.7909885	651	2.8135810	684	2.8350561
619	2.7916906	652	2.8142476	685	2.8356906
620	2.7923917	653	2.8149132	686	2.8363241
621	2.7930916	654	2.8155777	687	2.8369567
622	2.7937904	655	2.8162413	688	2.8375884
623	2.7944880	656	2.8169038	689	2.8382192
624	2.7951846	657	2.8175654	690	2.8388491
625	2.7958800	658	2.8182259	691	2.8394780
626	2.7965744	659	2.8188854	692	2.8401061
627	2.7972675	660	2.8195439	693	2.8407332
628	2.7979596	661	2.8202015	694	2.8413595
629	2.7986506	662	2.8208580	695	2.8419848
630	2.7993405	663	2.8215135	696	2.8426092
631	2.8000294	664	2.8221681	697	2.8432328
632	2.8007171	665	2.8228216	698	3.8438554
633	2.8014037	666	2.8234742	699	3.8444772
634	2.8020893	667	2.8241258	700	2.8450980

Num	Logarithm	Num	Logarithm	Num	Logarithm
701	2.8457180	734	2.8656961	767	2.8847954
702	2.8463371	735	2.8662873	768	2.8853612
703	2.8469553	736	2.8668778	769	2.8859263
704	2.8475727	737	2.8674675	770	2.8864907
705	2.8481891	738	2.8680564	771	2.8870544
706	2.8488047	739	2.8686444	772	2.8876173
707	2.8494194	740	2.8692317	773	2.8881795
708	2.8500333	741	2.8698182	774	2.8887410
709	2.8506462	742	2.8704039	775	2.8893017
710	2.8512583	743	2.8709888	776	2.8898617
711	2.8518696	744	2.8715729	777	2.8904210
712	2.8524800	745	2.8721563	778	2.8909796
713	2.8530895	746	2.8727388	779	2.8915375
714	2.8536982	747	2.8733206	780	2.8920946
715	2.8543060	748	2.8739016	781	2.8926510
716	2.8549130	749	2.8744818	782	2.8932067
717	2.8555191	750	2.8750613	783	2.8937618
718	2.8561244	751	2.8756399	784	2.8943161
719	2.8567289	752	2.8762178	785	2.8948696
720	2.8573325	753	2.8767950	786	2.8954225
721	2.8579353	754	2.8773713	787	2.8959747
722	2.8585372	755	2.8779469	788	2.8965262
723	2.8591383	756	2.8785218	789	2.8970770
724	2.8597386	757	2.8790959	790	2.8976271
725	2.8603380	758	2.8796692	791	2.8981765
726	2.8609366	759	2.8802418	792	2.8987252
727	2.8615344	760	2.8808136	793	2.8992732
728	2.8621314	761	2.8813847	794	2.8998205
729	2.8627275	762	2.8819550	795	2.9003671
730	2.8633229	763	2.8825245	796	2.9009131
731	2.8639174	764	2.8830934	797	2.9014583
732	2.8645111	765	2.8836614	798	2.9020029
733	2.8651040	766	2.8842283	799	2.9025468
734	2.8656961	767	2.8847954	800	2.9030900

Num	Logarithm	Num	Logarithm	Num	Logarithm
801	2.9036325	834	2.9211660	867	2.9380191
802	2.9041744	835	2.9216865	868	2.9385197
803	2.9047155	836	2.9222063	869	2.9390198
804	2.9052560	837	2.9227254	870	2.9395192
805	2.9057959	838	2.9232440	871	2.9400181
806	2.9063350	839	2.9237620	872	2.9405165
807	2.9068735	840	3.9242793	873	2.9410142
808	2.9074114	841	2.9247960	874	2.9415114
809	2.9079485	842	2.9253121	875	2.9420080
810	2.9084850	843	2.9258276	876	2.9425041
811	2.9090208	844	2.9263424	877	2.9429996
812	2.9095560	845	2.9268567	878	2.9434945
813	2.9100905	846	2.9273704	879	2.9439889
814	2.9106244	847	2.9278834	880	2.9444827
815	2.9111576	848	2.9283958	881	2.9449759
816	2.9116901	849	2.9289077	882	2.9454686
817	2.9122220	850	2.9294189	883	2.9459607
818	2.9127533	851	2.9299296	884	2.9464523
819	2.9132839	852	2.9304396	885	2.9469433
820	2.9138138	853	2.9309490	886	2.9474337
821	2.9143431	854	2.9314579	887	2.9479236
822	2.9148718	855	2.9319661	888	2.9484130
823	2.9153998	856	2.9324738	889	2.9489018
824	2.9159272	857	2.9329808	890	2.9493900
825	2.9164539	858	2.9334873	891	2.9498777
826	2.9169800	859	2.9339932	892	2.9503648
827	2.9175055	860	2.9344984	893	2.9508514
828	2.9180303	861	2.9350031	894	2.9513375
829	2.9185545	862	2.9355073	895	2.9518230
830	2.9190781	863	2.9360108	896	2.9523080
831	2.9196010	864	2.9365137	897	2.9527924
832	2.9201233	865	2.9370161	898	2.9532763
833	2.9206450	866	2.9375179	899	2.9537597
834	2.9211660	867	2.9380191	900	3.9542425

Num	Logarithm	Num	Logarithm	Num	Logarithm
901	2.9547248	934	2.9703469	967	2.9854265
902	2.9552065	935	2.9708116	968	2.9858753
903	2.9556877	936	2.9712758	969	2.9863238
904	2.9561684	937	2.9717396	970	2.9867717
905	2.9566486	938	2.9722028	971	2.9872192
906	2.9571282	939	2.9726657	972	2.9876663
907	2.9576073	940	2.9731278	973	2.9881128
908	2.9580858	941	2.9735896	974	2.9885589
909	2.9585639	942	2.9740509	975	2.9890046
910	2.9590414	943	2.9745116	976	2.9894498
911	2.9595184	944	2.9749720	977	2.9898946
912	2.9599948	945	2.9754318	978	2.9903388
913	2.9604708	946	2.9758911	979	2.9907827
914	2.9609462	947	2.9763500	980	2.9912261
915	2.9614211	948	2.9768083	981	2.9916690
916	2.9618955	949	2.9772662	982	2.9921115
917	2.9623693	950	2.9777236	983	2.9925535
918	2.9628427	951	2.9781805	984	2.9929951
919	2.9633155	952	2.9786369	985	2.9934362
920	2.9637878	953	2.9790929	986	2.9938769
921	2.9642596	954	2.9795484	987	2.9943171
922	2.9647309	955	2.9800034	988	2.9947569
923	2.9652017	956	2.9804579	989	2.9951963
924	2.9656720	957	2.9809119	990	2.9956352
925	2.9661417	958	2.9813655	991	2.9960736
926	2.9666110	959	2.9818186	992	2.9965117
927	2.9670797	960	2.9822712	993	2.9969492
928	2.9675480	961	2.9827234	994	2.9973864
929	2.9680157	962	2.9831751	995	2.9978231
930	2.9684829	963	2.9836263	996	2.9982593
931	2.9689497	964	2.9840770	997	2.9986951
932	2.9694159	965	2.9845273	998	2.9991305
933	2.9698816	966	2.9849771	999	2.9995655
934	2.9703469	967	2.9854265	1000	3.0000000

Num	Logarithm	Num	Logarithm	Num	Logarithm
1001	3.0004341	1034	3.0145205	1067	3.0281644
1002	3.0008677	1035	3.0149403	1068	3.0285712
1003	3.0013009	1036	3.0153597	1069	3.0289777
1004	3.0017337	1037	3.0157787	1070	3.0293838
1005	3.0021661	1038	3.0161973	1071	3.0297895
1006	3.0025980	1039	3.0166155	1072	3.0301948
1007	3.0030295	1040	3.0170333	1073	3.0305997
1008	3.0034605	1041	3.0174507	1074	3.0310043
1009	3.0038912	1042	3.0178677	1075	3.0314085
1010	3.0043214	1043	3.0182843	1076	3.0318123
1011	3.0047511	1044	3.0187005	1077	3.0322157
1012	3.0051805	1045	3.0191163	1078	3.0326188
1013	3.0056094	1046	3.0195317	1079	3.0330214
1014	3.0060379	1047	3.0199467	1080	3.0334237
1015	3.0064660	1048	3.0203613	1081	3.0338257
1016	3.0068937	1049	3.0207755	1082	3.0342273
1017	3.0073209	1050	3.0211893	1083	3.0346284
1018	3.0077478	1051	3.0216027	1084	3.0350293
1019	3.0081742	1052	3.0220157	1085	3.0354297
1020	3.0086002	1053	3.0224284	1086	3.0358298
1021	3.0090257	1054	3.0228406	1087	3.0362295
1022	3.0094509	1055	3.0232524	1088	3.0366289
1023	3.0098756	1056	3.0236639	1089	3.0370279
1024	3.0102999	1057	3.0240750	1090	3.0374265
1025	3.0107239	1058	3.0244857	1091	3.0378247
1026	3.0111474	1059	3.0248960	1092	3.0382226
1027	3.0115704	1060	3.0253059	1093	3.0386201
1028	3.0119931	1061	3.0257154	1094	3.0390173
1029	3.0124154	1062	3.0261245	1095	3.0394141
1030	3.0128372	1063	3.0265333	1096	3.0398105
1031	3.0132587	1064	3.0269416	1097	3.0402066
1032	3.0136797	1065	3.0273496	1098	3.0406023
1033	3.0141003	1066	3.0277572	1099	3.0409977
1034	3.0145205	1067	3.0281644	1100	3.0413927

Num	Logarithm	Num	Logarithm	Num	Logarithm
1101	3.0417873	1134	3.0546130	1167	3.0670708
1102	3.0421816	1135	3.0549958	1168	3.0674428
1103	3.0425755	1136	3.0553783	1169	3.0678145
1104	3.0429691	1137	3.0557604	1170	3.0681859
1105	3.0433623	1138	3.0561423	1171	3.0685569
1106	3.0437551	1139	3.0565237	1172	3.0689276
1107	3.0441476	1140	3.0569048	1173	3.0692980
1108	3.0445398	1141	3.0572856	1174	3.0696681
1109	3.0449315	1142	3.0576661	1175	3.0700379
1110	3.0453230	1143	3.0580462	1176	3.0704073
1111	3.0457140	1144	3.0584260	1177	3.0707765
1112	3.0461048	1145	3.0588055	1178	3.0711453
1113	3.0464952	1146	3.0591846	1179	3.0715138
1114	3.0468852	1147	3.0595634	1180	3.0718826
1115	3.0472749	1148	3.0599419	1181	3.0722499
1116	3.0476642	1149	3.0603200	1182	3.0726175
1117	3.0480532	1150	3.0606978	1183	3.0729847
1118	3.0484418	1151	3.0610753	1184	3.0733517
1119	3.0488301	1152	3.0614525	1185	3.0737183
1120	3.0492180	1153	3.0618293	1186	3.0740847
1121	3.0496056	1154	3.0622058	1187	3.0744507
1122	3.0499928	1155	3.0625820	1188	3.0748164
1123	3.0503797	1156	3.0629578	1189	3.0751818
1124	3.0507663	1157	3.0633334	1190	3.0755470
1125	3.0511525	1158	3.0637085	1191	3.0759118
1126	3.0515384	1159	3.0640834	1192	3.0762762
1127	3.0519239	1160	3.0644580	1193	3.0766404
1128	3.0523091	1161	3.0648322	1194	3.0770043
1129	3.0526939	1162	3.0652061	1195	3.0773679
1130	3.0530784	1163	3.0655797	1196	3.0777312
1131	3.0534626	1164	3.0659530	1197	3.0780941
1132	3.0538464	1165	3.0663259	1198	3.0784568
1133	3.0542299	1166	3.0666985	1199	3.0788192
1134	3.0546130	1167	3.0670708	1200	3.0791812

Num	Logarithm	Num	Logarithm	Num	Logarithm
1201	3.0795430	1234	3.0913151	1267	3.1027766
1202	3.0799045	1235	3.0916669	1268	3.1031192
1203	3.0802656	1236	3.0920185	1269	3.1034616
1204	3.0806265	1237	3.0923697	1270	3.1038037
1205	3.0809870	1238	3.0927206	1271	3.1041455
1206	3.0813473	1239	3.0930713	1272	3.1044871
1207	3.0817073	1240	3.0934217	1273	3.1048284
1208	3.0820669	1241	3.0437718	1274	3.1051694
1209	3.0824263	1242	3.0941216	1275	3.1055102
1210	3.0827854	1243	3.0944711	1276	3.1058507
1211	3.0831441	1244	3.0948204	1277	3.1061909
1212	3.0835026	1245	3.0951693	1278	3.1065308
1213	3.0838608	1246	3.0955180	1279	3.1068705
1214	3.0842187	1247	3.0958664	1280	3.1072100
1215	3.0845763	1248	3.0962145	1281	3.1075491
1216	3.0849336	1249	3.0965624	1282	3.1078880
1217	3.0852906	1250	3.0969100	1283	3.1082266
1218	3.0856473	1251	3.0972573	1284	3.1085650
1219	3.0860037	1252	3.0976043	1285	3.1089031
1220	3.0863598	1253	3.0979511	1286	3.1092410
1221	3.0867156	1254	3.0982975	1287	3.1095785
1222	3.0870712	1255	3.0986437	1288	3.1099159
1223	3.0874264	1256	3.0989896	1289	3.1102529
1224	3.0877814	1257	3.0993353	1290	3.1105897
1225	3.0881361	1258	3.0996806	1291	3.1109262
1226	3.0884905	1259	3.1000257	1292	3.1112625
1227	3.0888446	1260	3.1003705	1293	3.1115985
1228	3.0891984	1261	3.1007151	1294	3.1119343
1229	3.0895519	1262	3.1010593	1295	3.1122698
1230	3.0899051	1263	3.1014033	1296	3.1126050
1231	3.0902580	1264	3.1017471	1297	3.1129400
1232	3.0906107	1265	3.1020905	1298	3.1132747
1233	3.0909631	1266	3.1024337	1299	3.1136091
1234	3.0913151	1267	3.1027766	1300	3.1139433

Num	Logarithm	Num	Logarithm	Num	Logarithm
1301	3.1142773	1334	3.1251558	1367	3.1357685
1302	3.1146110	1335	3.1254813	1368	3.1360861
1303	3.1149444	1336	3.1258064	1369	3.1364034
1304	3.1152776	1337	3.1261314	1370	3.1367206
1305	3.1156105	1338	3.1264561	1371	3.1370374
1306	3.1159432	1339	3.1267806	1372	3.1373541
1307	3.1162756	1340	3.1271048	1373	3.1376705
1308	3.1166077	1341	3.1274288	1374	3.1379867
1309	3.1169396	1342	3.1277525	1375	3.1383027
1310	3.1172713	1343	3.1280760	1376	3.1386184
1311	3.1176027	1344	3.1283993	1377	3.1389339
1312	3.1179338	1345	3.1287223	1378	3.1392492
1313	3.1182647	1346	3.1290450	1379	3.1395643
1314	3.1185954	1347	3.1293676	1380	3.1398791
1315	3.1189257	1348	3.1296899	1381	3.1401937
1316	3.1192559	1349	3.1300119	1382	3.1405080
1317	3.1195858	1350	3.1303338	1383	3.1408222
1318	3.1199154	1351	3.1306553	1384	3.1411361
1319	3.1202448	1352	3.1309767	1385	3.1414498
1320	3.1205739	1353	3.1312978	1386	3.1417632
1321	3.1209028	1354	3.1316187	1387	3.1420765
1322	3.1212314	1355	3.1319393	1388	3.1423895
1323	3.1215598	1356	3.1322597	1389	3.1427022
1324	3.1218880	1357	3.1325798	1390	3.1430148
1325	3.1222159	1358	3.1328998	1391	3.1433271
1326	3.1225435	1359	3.1332195	1392	3.1436392
1327	3.1228709	1360	3.1335389	1393	3.1439511
1328	3.1231981	1361	3.1338581	1394	3.1442628
1329	3.1235250	1362	3.1341771	1395	3.1445742
1330	3.1238516	1363	3.1344958	1396	3.1448854
1331	3.1241780	1364	3.1348144	1397	3.1451964
1332	3.1245042	1365	3.1351326	1398	3.1455072
1333	3.1248301	1366	3.1354507	1399	3.1458177
1334	3.1251558	1367	3.1357685	1400	3.1461280

Num	Logarithm	Num	Logarithm	Num	Logarithm
1401	3.1464381	1434	3.1565491	1467	3.1664301
1402	3.1467480	1435	3.1568519	1468	3.1667260
1403	3.1470577	1436	3.1571544	1469	3.1670218
1404	3.1473671	1437	3.1574568	1470	3.1673173
1405	3.1476763	1438	3.1577589	1471	3.1676127
1406	3.1479853	1439	3.1580608	1472	3.1679078
1407	3.1482941	1440	3.1583625	1473	3.1682027
1408	3.1486026	1441	3.1586640	1474	3.1684975
1409	3.1489110	1442	3.1589653	1475	3.1687920
1410	3.1492191	1443	3.1592663	1476	3.1690863
1411	3.1495270	1444	3.1595672	1477	3.1693805
1412	3.1498347	1445	3.1598678	1478	3.1696744
1413	3.1501422	1446	3.1601683	1479	3.1699682
1414	3.1504494	1447	3.1604685	1480	3.1702617
1415	3.1507564	1448	3.1607686	1481	3.1705550
1416	3.1510632	1449	3.1610684	1482	3.1708482
1417	3.1513698	1450	3.1613680	1483	3.1711411
1418	3.1516762	1451	3.1616674	1484	3.1714339
1419	3.1519824	1452	3.1619666	1485	3.1717264
1420	3.1522883	1453	3.1622656	1486	3.1720188
1421	3.1525941	1454	3.1625644	1487	3.1723110
1422	3.1528996	1455	3.1628630	1488	3.1726029
1423	3.1532049	1456	3.1631614	1489	3.1728947
1424	3.1535100	1457	3.1634595	1490	3.1731863
1425	3.1538149	1458	3.1637575	1491	3.1734776
1426	3.1541195	1459	3.1640553	1492	3.1737688
1427	3.1544240	1460	3.1643528	1493	3.1740598
1428	3.1547282	1461	3.1646502	1494	3.1743506
1429	3.1550322	1462	3.1649474	1495	3.1746412
1430	3.1553360	1463	3.1652443	1496	3.1749316
1431	3.1556396	1464	3.1655411	1497	3.1752218
1432	3.1559430	1465	3.1658376	1498	3.1755118
1433	3.1562462	1466	3.1661340	1499	3.1758016
1434	3.1565491	1467	3.1664301	1500	3.1760913

Num	Logarithm	Num	Logarithm	Num	Logarithm
1501	3.1763807	1534	3.1858253	1567	3.1950693
1502	3.1766699	1535	3.1861084	1568	3.1953460
1503	3.1769590	1536	3.1863912	1569	3.1956229
1504	3.1772478	1537	3.1866739	1570	3.1958996
1505	3.1775365	1538	3.1869563	1571	3.1961762
1506	3.1778250	1539	3.1872386	1572	3.1964525
1507	3.1781132	1540	3.1875207	1573	3.1967287
1508	3.1784013	1541	3.1878026	1574	3.1970047
1509	3.1786892	1542	3.1880844	1575	3.1972806
1510	3.1789769	1543	3.1883659	1576	3.1975562
1511	3.1792645	1544	3.1886473	1577	3.1978317
1512	3.1795518	1545	3.1889285	1578	3.1981070
1513	3.1798389	1546	3.1892095	1579	3.1983821
1514	3.1801259	1547	3.1894903	1580	3.1986571
1515	3.1804126	1548	3.1897709	1581	3.1989319
1516	3.1806992	1549	3.1900514	1582	3.1992065
1517	3.1809856	1550	3.1903317	1583	3.1994809
1518	3.1812718	1551	3.1906118	1584	3.1997552
1519	3.1815578	1552	3.1908917	1585	3.2000293
1520	3.1818436	1553	3.1911714	1586	3.2003032
1521	3.1821292	1554	3.1914510	1587	3.2005769
1522	3.1824146	1555	3.1917304	1588	3.2008505
1523	3.1826999	1556	3.1920096	1589	3.2011239
1524	3.1829850	1557	3.1922886	1590	3.2013971
1525	3.1832698	1558	3.1925674	1591	3.2016702
1526	3.1835545	1559	3.1928461	1592	3.2019431
1527	3.1838390	1560	3.1931246	1593	3.2022158
1528	3.1841233	1561	3.1934029	1594	3.2024883
1529	3.1844075	1562	3.1936810	1595	3.2027607
1530	3.1846914	1563	3.1939590	1596	3.2030329
1531	3.1849752	1564	3.1942367	1597	3.2033049
1532	3.1852588	1565	3.1945143	1598	3.2035768
1533	3.1855421	1566	3.1947917	1599	3.2038485
1534	3.1858253	1567	3.1950690	1600	3.2041200

Num	Logarithm	Num	Logarithm	Num	Logarithm
1601	3.2043913	1634	3.2132521	1667	3.2219356
1602	3.2046625	1635	3.2135178	1668	3.2221960
1603	3.2049335	1636	3.2137833	1669	3.2224563
1604	3.2052044	1637	3.2140487	1670	3.2227165
1605	3.2054750	1638	3.2143149	1671	3.2229764
1606	3.2057455	1639	3.2145789	1672	3.2232363
1607	3.2060159	1640	3.2148438	1673	3.2234959
1608	3.2062860	1641	3.2151086	1674	3.2237555
1609	3.2065560	1642	3.2153732	1675	3.2240148
1610	3.2068259	1643	3.2156376	1676	3.2242740
1611	3.2070955	1644	3.2159018	1677	3.2245331
1612	3.2073650	1645	3.2161659	1678	3.2247920
1613	3.2076344	1646	3.2164298	1679	3.2250507
1614	3.2079035	1647	3.2166936	1680	3.2253093
1615	3.2081725	1648	3.2169572	1681	3.2255677
1616	3.2084414	1649	3.2172206	1682	3.2258260
1617	3.2087100	1650	3.2174839	1683	3.2260841
1618	3.2089785	1651	3.2177471	1684	3.2263421
1619	3.2092468	1652	3.2180100	1685	3.2265999
1620	3.2095150	1653	3.2182728	1686	3.2268576
1621	3.2097830	1654	3.2185355	1687	3.2271151
1622	3.2100508	1655	3.2187980	1688	3.2273724
1623	3.2103185	1656	3.2190603	1689	3.2276296
1624	3.2105860	1657	3.2193225	1690	3.2278867
1625	3.2108534	1658	3.2195845	1691	3.2281436
1626	3.2111205	1659	3.2198464	1692	3.2284004
1627	3.2113876	1660	3.2201081	1693	3.2286570
1628	3.2116544	1661	3.2203696	1694	3.2289134
1629	3.2119211	1662	3.2206310	1695	3.2291697
1630	3.2121876	1663	3.2208922	1696	3.2294258
1631	3.2124540	1664	3.2211533	1697	3.2296818
1632	3.2127201	1665	3.2214142	1798	3.2299377
1633	3.2129862	1666	3.2216750	1699	3.2301934
1634	3.2132521	1667	3.2219356	1700	3.2304489

Num	Logarithm	Num	Logarithm	Num	Logarithm
1701	3.2307043	1734	3.2390491	1767	3.2472365
1702	3.2309596	1735	3.2392995	1768	3.2474823
1703	3.2312146	1736	3.2395497	1769	3.2477278
1704	3.2314696	1737	3.2397998	1770	3.2479733
1705	3.2317244	1738	3.2400498	1771	3.2482186
1706	3.2319790	1739	3.2402996	1772	3.2484637
1707	3.2322335	1740	3.2405492	1773	3.2487087
1708	3.2324879	1741	3.2407988	1774	3.2489536
1709	3.2327421	1742	3.2410481	1775	3.2491984
1710	3.2329961	1743	3.2412974	1776	3.2494430
1711	3.2332500	1744	3.2415465	1777	3.2496874
1712	3.2335038	1745	3.2417954	1778	3.2499318
1713	3.2337574	1746	3.2420442	1779	3.2501759
1714	3.2340108	1747	3.2422929	1780	3.2504200
1715	3.2342641	1748	3.2425414	1781	3.2506639
1716	3.2345173	1749	3.2427898	1782	3.2509077
1717	3.2347703	1750	3.2430380	1783	3.2511513
1718	3.2350232	1751	3.2432861	1784	3.2513948
1719	3.2352759	1752	3.2435341	1785	3.2516382
1720	3.2355284	1753	3.2437819	1786	3.2518815
1721	3.2357809	1754	3.2440296	1787	3.2521246
1722	3.2360331	1755	3.2442771	1788	3.2523675
1723	3.2362853	1756	3.2445245	1789	3.2526103
1724	3.2365373	1757	3.2447718	1790	3.2528530
1725	3.2367891	1758	3.2450189	1791	3.2530956
1726	3.2370408	1759	3.2452658	1792	3.2533380
1727	3.2372923	1760	3.2455127	1793	3.2535803
1728	3.2375437	1761	3.2457594	1794	3.2538224
1729	3.2377950	1762	3.2460059	1795	3.2540645
1730	3.2380461	1763	3.2462523	1796	3.2543063
1731	3.2382971	1764	3.2464986	1797	3.2545481
1732	3.2385479	1765	3.2467447	1798	3.2547897
1733	3.2387986	1766	3.2469907	1799	3.2550312
1734	3.2390491	1767	3.2472365	1800	3.2552725

Num	Logarithm	Num	Logarithm	Num	Logarithm
1801	3.2555137	1834	3.2633993	1867	3.2711443
1802	3.2557548	1835	3.2636361	1868	3.2713769
1803	3.2559957	1836	3.2638727	1869	3.2716093
1804	3.2562365	1837	3.2641092	1870	3.2718416
1805	3.2564772	1838	3.2643455	1871	3.2720738
1806	3.2567177	1839	3.2645817	1872	3.2723058
1807	3.2569582	1840	3.2648178	1873	3.2725378
1808	3.2571984	1841	3.2650538	1874	3.2727696
1809	3.2574386	1842	3.2652896	1875	3.2730013
1810	3.2576786	1843	3.2655253	1876	3.2732328
1811	3.2579184	1844	3.2657609	1877	3.2734643
1812	3.2581582	1845	3.2659964	1878	3.2736956
1813	3.2583978	1846	3.2662317	1879	3.2739268
1814	3.2586373	1847	3.2664669	1880	3.2741578
1815	3.2588766	1848	3.2667020	1881	3.2743888
1816	3.2591158	1849	3.2669369	1882	3.2746196
1817	3.2593549	1850	3.2671717	1883	3.2748503
1818	3.2595939	1851	3.2674064	1884	3.2750809
1819	3.2598327	1852	3.2676410	1885	3.2753113
1820	3.2600714	1853	3.2678754	1886	3.2755417
1821	3.2603099	1854	3.2681097	1887	3.2757719
1822	3.2605484	1855	3.2683439	1888	3.2760020
1823	3.2607867	1856	3.2685780	1889	3.2762320
1824	3.2610248	1857	3.2688119	1890	3.2764618
1825	3.2612629	1858	3.2690457	1891	3.2766915
1826	3.2615008	1859	3.2692794	1892	3.2769211
1827	3.2617385	1860	3.2695129	1893	3.2771506
1828	3.2619762	1861	3.2697464	1894	3.2773800
1829	3.2622137	1862	3.2699797	1895	3.2776092
1830	3.2624511	1863	3.2702128	1896	3.2778383
1831	3.2626883	1864	3.2704459	1897	3.2780673
1832	3.2629255	1865	3.2706788	1898	3.2782962
1833	3.2631625	1866	3.2709116	1899	3.2785250
1834	3.2633993	1867	3.2711443	1900	3.2787536

1900

Num	Logarithm	Num	Logarithm	Num	Logarithm
1901	3.2789821	1934	3.2864565	1967	3.2938044
1902	3.2792105	1935	3.2866810	1968	3.2940251
1903	3.2794388	1936	3.2869054	1969	3.2942457
1904	3.2796669	1937	3.2871296	1970	3.2944662
1905	3.2798950	1938	3.2873538	1971	3.2946866
1906	3.2801229	1939	3.2875778	1972	3.2949069
1907	3.2803507	1940	3.2878017	1973	3.2951271
1908	3.2805784	1941	3.2880255	1974	3.2953471
1909	3.2808059	1942	3.2882492	1975	3.2955671
1910	3.2810334	1943	3.2884728	1976	3.2957869
1911	3.2812607	1944	3.2886963	1977	3.2960067
1912	3.2814879	1945	3.2889196	1978	3.2962263
1913	3.2817150	1946	3.2891428	1979	3.2964458
1914	3.2819419	1947	3.2893659	1980	3.2966652
1915	3.2821688	1948	3.2895889	1981	3.2968845
1916	3.2823955	1949	3.2898118	1982	3.2971036
1917	3.2826221	1950	3.2900346	1983	3.2973227
1918	3.2828486	1951	3.2902573	1984	3.2975417
1919	3.2830750	1952	3.2904798	1985	3.2977605
1920	3.2833012	1953	3.2907022	1986	3.2979792
1921	3.2835274	1954	3.2909246	1987	3.2981979
1922	3.2837534	1955	3.2911468	1988	3.2984164
1923	3.2839793	1956	3.2913688	1989	3.2986348
1924	3.2842051	1957	3.2915908	1990	3.2988531
1925	3.2844307	1958	3.2918127	1991	3.2990713
1926	3.2846563	1959	3.2920344	1992	3.2992893
1927	3.2848817	1960	3.2922561	1993	3.2995073
1928	3.2851070	1961	3.2924776	1994	3.2997251
1929	3.2853322	1962	3.2926990	1995	3.2999429
1930	3.2855573	1963	3.2929203	1996	3.3001605
1931	3.2857823	1964	3.2931415	1997	3.3003781
1932	3.2860071	1965	3.2933626	1998	3.3005955
1933	3.2862318	1966	3.2935835	1999	3.3008128
1934	3.2864565	1967	3.2938044	2000	3.3010300

2000

Num	Logarithm	Num	Logarithm	Num	Logarithm
2001	3.3012471	2034	3.3083509	2067	3.3153405
2002	3.3014641	2035	3.3085644	2068	3.3155505
2003	3.3016809	2036	3.3087778	2069	3.3157675
2004	3.3018977	2037	3.3089910	2070	3.3159703
2005	3.3021144	2038	3.3092042	2071	3.3161801
2006	3.3023309	2039	3.3094172	2072	3.3163897
2007	3.3025474	2040	3.3096302	2073	3.3165993
2008	3.3027637	2041	3.3098430	2074	3.3168087
2009	3.3029799	2042	3.3100557	2075	3.3170181
2010	3.3031961	2043	3.3102684	2076	3.3172273
2011	3.3034121	2044	3.3704809	2077	3.3174365
2012	3.3036280	2045	3.3106933	2078	3.3176455
2013	3.3038438	2046	3.3109056	2079	3.3178545
2014	3.3040595	2047	3.3111178	2080	3.3180633
2015	3.3042751	2048	3.3113299	2081	3.3182721
2016	3.3044905	2049	3.3115420	2082	3.3184807
2017	3.3047059	2050	3.3117539	2083	3.3186893
2018	3.3049212	2051	3.3119657	2084	3.3188977
2019	3.3051363	2052	3.3121774	2085	3.3191061
2020	3.3053514	2053	3.3123889	2086	3.3193143
2021	3.3055663	2054	3.3126004	2087	3.3195224
2022	3.3057812	2055	3.3128118	2088	3.3197305
2023	3.3059959	2056	3.3130231	2089	3.3199384
2024	3.3062105	2057	3.3132343	2090	3.3201463
2025	3.3064250	2058	3.3134454	2091	3.3203540
2026	3.3066394	2059	3.3136563	2092	3.3205617
2027	3.3068537	2060	3.3138672	2093	3.3207692
2028	3.3070679	2061	3.3140780	2094	3.3209767
2029	3.3072820	2062	3.3142887	2095	3.3211840
2030	3.3074960	2063	3.3144992	2096	3.3213913
2031	3.3077099	2064	3.3147095	2097	3.3215984
2032	3.3079237	2065	3.3149200	2098	3.3218055
2033	3.3081374	2066	3.3151303	2099	3.3220124
2034	3.3083509	2067	3.3153405	2100	3.3222193

Num	Logarithm	Num	Logarithm	Num	Logarithm
2101	3.3224260	2134	3.3291944	2167	3.3358589
2102	3.3226327	2135	3.3293979	2168	3.3360593
2103	3.3228393	2136	3.3296012	2169	3.3362596
2104	3.3230457	2137	3.3298045	2170	3.3364597
2105	3.3232521	2138	3.3000077	2171	3.3366598
2106	3.3234584	2139	3.3302108	2172	3.3368598
2107	3.3236645	2140	3.3304138	2173	3.3370597
2108	3.3238706	2141	3.3306167	2174	3.3372595
2109	3.3240766	2142	3.3308195	2175	3.3374593
2110	3.3242825	2143	3.3310222	2176	3.3376589
2111	3.3244882	2144	3.3312248	2177	3.3378584
2112	3.3246939	2145	3.3314273	2178	3.3380579
2113	3.3248995	2146	3.3316297	2179	3.3382572
2114	3.3251050	2147	3.3318320	2180	3.3384565
2115	3.3253104	2148	3.3320343	2181	3.3386557
2116	3.3255157	2149	3.3322364	2182	3.3388547
2117	3.3257209	2150	3.3324385	2183	3.3390537
2118	3.3259260	2151	3.3326404	2184	3.3392526
2119	3.3261310	2152	3.3328423	2185	3.3394514
2120	3.3263359	2153	3.3330440	2186	3.3396501
2121	3.3265407	2154	3.3332457	2187	3.3398488
2122	3.3267454	2155	3.3334473	2188	3.3400473
2123	3.3269500	2156	3.3336488	2189	3.3402458
2124	3.3271545	2157	3.3338501	2190	3.3404441
2125	3.3273589	2158	3.3340514	2191	3.3406424
2126	3.3275633	2159	3.3342526	2192	3.3408405
2127	3.3277675	2160	3.3344537	2193	3.3410386
2128	3.3279716	2161	3.3346548	2194	3.3412366
2129	3.3281757	2162	3.3348557	2195	3.3414345
2130	3.3283796	2163	3.3350565	2196	3.3416323
2131	3.3285834	2164	3.3352572	2197	3.3418301
2132	3.3287872	2165	3.3354579	2198	3.3420277
2133	3.3289909	2166	3.3356585	2199	3.3422252
2134	3.3291944	2167	3.3358589	2200	3.3424227

Num	Logarithm	Num	Logarithm	Num	Logarithm
2201	3.3426203	2234	3.3490832	2267	3.3554515
2202	3.3428173	2235	3.3492775	2268	3.3556430
2203	3.3430145	2236	3.3494718	2269	3.3558345
2204	3.3432116	2237	3.3496660	2270	3.3560259
2205	3.3434086	2238	3.3498601	2271	3.3562171
2206	3.3436055	2239	3.3500541	2272	3.3564083
2207	3.3438023	2240	3.3502480	2273	3.3565994
2208	3.3439991	2241	3.3504419	2274	3.3567905
2209	3.3441957	2242	3.3506356	2275	3.3569814
2210	3.3443923	2243	3.3508293	2276	3.3571723
2211	3.3445887	2244	3.3510228	2277	3.3573630
2212	3.3447851	2245	3.3512163	2278	3.3575537
2213	3.3449814	2246	3.3514098	2279	3.3577443
2214	3.3451776	2247	3.3516031	2280	3.3579348
2215	3.3453737	2248	3.3517963	2281	3.3581253
2216	3.3455698	2249	3.3519895	2282	3.3583156
2217	3.3457657	2250	3.3521825	2283	3.3585059
2218	3.3459615	2251	3.3523755	2284	3.3586961
2219	3.3461573	2252	3.3525684	2285	3.3588862
2220	3.3463530	2253	3.3527612	2286	3.3590762
2221	3.3465486	2254	3.3529539	2287	3.3592662
2222	3.3467441	2255	3.3531465	2288	3.3594560
2223	3.3469395	2256	3.3533391	2289	3.3596458
2224	3.3471348	2257	3.3535316	2290	3.3598355
2225	3.3473300	2258	3.3537239	2291	3.3600251
2226	3.3475252	2259	3.3539162	2292	3.3602146
2227	3.3477202	2260	3.3541084	2293	3.3604041
2228	3.3479152	2261	3.3543006	2294	3.3605934
2229	3.3481101	2262	3.3544926	2295	3.3607827
2230	3.3483049	2263	3.3546846	2296	3.3609719
2231	3.3484996	2264	3.3548764	2297	3.3611610
2232	3.3486942	2265	3.3550682	2298	3.3613500
2233	3.3488887	2266	3.3552599	2299	3.3615390
2234	3.3490832	2267	3.3554515	2300	3.3617278

Num	Logarithm	Num	Logarithm	Num	Logarithm
2301	3.3619166	2334	3.3681008	2367	3.3741983
2302	3.3621053	2335	3.3682869	2368	3.3743817
2303	3.3622939	2336	3.3684728	2369	3.3745651
2304	3.3624825	2337	3.3686587	2370	3.3747483
2305	3.3626709	2338	3.3688445	2371	3.3749316
2306	3.3628593	2339	3.3690302	2372	3.3751147
2307	3.3630476	2340	3.3692159	2373	3.3752977
2308	3.3632358	2341	3.3694014	2374	3.3754807
2309	3.3634239	2342	3.3695869	2375	3.3756636
2310	3.3636120	2343	3.3697723	2376	3.3758464
2311	3.3637999	2344	3.3699576	2377	3.3760292
2312	3.3639878	2345	3.3701428	2378	3.3762118
2313	3.3641755	2346	3.3703280	2379	3.3763944
2314	3.3643633	2347	3.3705131	2380	3.3765769
2315	3.3645510	2348	3.3706981	2381	3.3767594
2316	3.3647386	2349	3.3708830	2382	3.3769418
2317	3.3649260	2350	3.3710679	2383	3.3771240
2318	3.3651134	2351	3.3712526	2384	3.3773062
2319	3.3653007	2352	3.3714373	2385	3.3775884
2320	3.3654880	2353	3.3716219	2386	3.3777704
2321	3.3656751	2354	3.3718065	2387	3.3779524
2322	3.3658622	2355	3.3719909	2388	3.3781343
2323	3.3660492	2356	3.3721753	2389	3.3783161
2324	3.3662361	2357	3.3723596	2390	3.3784979
2325	3.3664230	2358	3.3725438	2391	3.3786796
2326	3.3666097	2359	3.3727279	2392	3.3788612
2327	3.3667964	2360	3.3729120	2393	3.3790427
2328	3.3669830	2361	3.3730960	2394	3.3792241
2329	3.3671695	2362	3.3732799	2395	3.3794055
2330	3.3673559	2363	3.3734637	2396	3.3795868
2331	3.3675423	2364	3.3736475	2397	3.3797680
2332	3.3677285	2365	3.3738311	2398	3.3799492
2333	3.3679147	2366	3.3740147	2399	3.3801302
2334	3.3681008	2367	3.3741983	2400	3.3802112

2400

Num	Logarithm	Num	Logarithm	Num	Logarithm
2401	3.3803922	2434	3.3863206	2467	3.3921691
2402	3.3805730	2435	3.3864990	2468	3.3923452
2403	3.3807538	2436	3.3866773	2469	3.3925214
2404	3.3809345	2437	3.3868555	2470	3.3926969
2405	3.3811151	2438	3.3870337	2471	3.3928727
2406	3.3812951	2439	3.3872118	2472	3.3930485
2407	3.3814761	2440	3.3873898	2473	3.3932241
2408	3.3816565	2441	3.3875678	2474	3.3933997
2409	3.3818368	2442	3.3877457	2475	3.3935752
2410	3.3820170	2443	3.3879235	2476	3.3937506
2411	3.3821972	2444	3.3881012	2477	3.3939260
2412	3.3823773	2445	3.3882789	2478	3.3941013
2413	3.3825573	2446	3.3884565	2479	3.3942765
2414	3.3827373	2447	3.3886340	2480	3.3944517
2415	3.3829171	2448	3.3888114	2481	3.3946268
2416	3.3830969	2449	3.3889888	2482	3.3948018
2417	3.3832766	2450	3.3891661	2483	3.3949767
2418	3.3834563	2451	3.3893433	2484	3.3951516
2419	3.3836359	2452	3.3895205	2485	3.3953264
2420	3.3838154	2453	3.3896975	2486	3.3955011
2421	3.3839948	2454	3.3898746	2487	3.3956758
2422	3.3841741	2455	3.3900515	2488	3.3958504
2423	3.3843534	2456	3.3902284	2489	3.3960249
2424	3.3845326	2457	3.3904052	2490	3.3961993
2425	3.3847117	2458	3.3905819	2491	3.3963737
2426	3.3848908	2459	3.3907585	2492	3.3965480
2427	3.3850698	2460	3.3909351	2493	3.3967223
2428	3.3852487	2461	3.3911116	2494	3.3968964
2429	3.3854275	2462	3.3912880	2495	3.3970705
2430	3.3856063	2463	3.3914644	2496	3.3972446
2431	3.3857850	2464	3.3916407	2497	3.3974185
2432	3.3859636	2465	3.3918169	2498	3.3975924
2433	3.3861421	2466	3.3919931	2499	3.3977662
2434	3.3863206	2467	3.3921691	2500	3.3979400

Num	Logarithm	Num	Logarithm	Num	Logarithm
2501	3.3981137	2534	3.4038066	2567	3.4094259
2502	3.3982873	2535	3.4039780	2568	3.4095950
2503	3.3984608	2536	3.4041492	2569	3.4097641
2504	3.3986343	2537	3.4043205	2570	3.4099331
2505	3.3988077	2538	3.4044916	2571	3.4101021
2506	3.3989811	2539	3.4046627	2572	3.4102710
2507	3.3991543	2540	3.4048337	2573	3.4104398
2508	3.3993275	2541	3.4050047	2574	3.4106085
2509	3.3995007	2542	3.4051755	2575	3.4107772
2510	3.3996737	2543	3.4053464	2576	3.4109459
2511	3.3998467	2544	3.4055171	2577	3.4111144
2512	3.4000196	2545	3.4056878	2578	3.4112829
2513	3.4001925	2546	3.4058584	2579	3.4114513
2514	3.4003653	2547	3.4060289	2580	3.4116197
2515	3.4005380	2548	3.4061994	2581	3.4117880
2516	3.4007106	2549	3.4053698	2582	3.4119562
2517	3.4008832	2550	3.4065402	2583	3.4121244
2518	3.4010557	2551	3.4067105	2584	3.4122925
2519	3.4012282	2552	3.4068807	2585	3.4124605
2520	3.4014005	2553	3.4070508	2586	3.4126285
2521	3.4015728	2554	3.4072209	2587	3.4127964
2522	3.4017451	2555	3.4073909	2588	3.4129643
2523	3.4019173	2556	3.4075608	2589	3.4131320
2524	3.4020893	2557	3.4077307	2590	3.4132998
2525	3.4022614	2558	3.4079005	2591	3.4134674
2526	3.4024333	2559	3.4080703	2592	3.4136350
2527	3.4026052	2560	3.4082400	2593	3.4138025
2528	3.4027771	2561	3.4084096	2594	3.4139700
2529	3.4029488	2562	3.4085791	2595	3.4141374
2530	3.4031205	2563	3.4087486	2596	3.4143047
2531	3.4032921	2564	3.4089180	2597	3.4144719
2532	3.4034637	2565	3.4090874	2598	3.4146391
2533	3.4036352	2566	3.4092567	2599	3.4148063
2534	3.4038066	2567	3.4094259	2600	3.4149733

Num	Logarithm	Num	Logarithm	Num	Logarithm
2601	3.4151404	2634	3.4206158	2667	3.4260230
2602	3.4153073	2635	3.4207806	2668	3.4261858
2603	3.4154742	2636	3.4209454	2669	3.4263486
2604	3.4156410	2637	3.4211101	2670	3.4265113
2605	3.4158077	2638	3.4212748	2671	3.4266739
2606	3.4159744	2639	3.4214394	2672	3.4268365
2607	3.4161410	2640	3.4216039	2673	3.4269990
2608	3.4163076	2641	3.4217684	2674	3.4271614
2609	3.4164471	2642	3.4219328	2675	3.4273238
2610	3.4166055	2643	3.4220972	2676	3.4274861
2611	3.4168062	2644	3.4222614	2677	3.4276484
2612	3.4169732	2645	3.4224257	2678	3.4278106
2613	3.4171394	2646	3.4225898	2679	3.4279727
2614	3.4173056	2647	3.4227539	2680	3.4281348
2615	3.4174717	2648	3.4229180	2681	3.4282968
2616	3.4176377	2649	3.4230820	2682	3.4284588
2617	3.4178037	2650	3.4232459	2683	3.4286207
2618	3.4179696	2651	3.4234097	2684	3.4287825
2619	3.4181355	2652	3.4235735	2685	3.4289443
2620	3.4183013	2653	3.4237372	2686	3.4291060
2621	3.4184670	2654	3.4239009	2687	3.4292677
2622	3.4186327	2655	3.4240645	2688	3.4294293
2623	3.4187983	2656	3.4242281	2689	3.4295908
2624	3.4189638	2657	3.4243916	2690	3.4297523
2625	3.4191293	2658	3.4245550	2691	3.4299137
2626	3.4192947	2659	3.4247183	2692	3.4300751
2627	3.4194601	2660	3.4248816	2693	3.4302364
2628	3.4196254	2661	3.4250449	2694	3.4303976
2629	3.4197906	2662	3.4252080	2695	3.4305588
2630	3.4199557	2663	3.4253712	2696	3.4307199
2631	3.4201208	2664	3.4255342	2697	3.4308809
2632	3.4202859	2665	3.4256972	2698	3.4310419
2633	3.4204509	2666	3.4258601	2699	3.4312029
2634	3.4206158	2667	3.4260230	2700	3.4313638

Num	Logarithm	Num	Logarithm	Num	Logarithm
2701	3.4315426	2734	3.4367085	2767	3.4420092
2702	3.4316853	2735	3.4369573	2768	3.4421661
2703	3.4318460	2736	3.4371161	2769	3.4423229
2704	3.4320067	2737	3.4372748	2770	3.4424798
2705	3.4321673	2738	3.4374334	2771	3.4426365
2706	3.4323278	2739	3.4375920	2772	3.4427932
2707	3.4324882	2740	3.4377506	2773	3.4429499
2708	3.4326487	2741	3.4379090	2774	3.4431065
2709	3.4328090	2742	3.4380674	2775	3.4432630
2710	3.4329693	2743	3.4382258	2776	3.4434195
2711	3.4331295	2744	3.4383841	2777	3.4435759
2712	3.4332897	2745	3.4385423	2778	3.4437322
2713	3.4334498	2746	3.4387005	2779	3.4438885
2714	3.4336098	2747	3.4388587	2780	3.4440448
2715	3.4337698	2748	3.4390167	2781	3.4442010
2716	3.4339298	2749	3.4391747	2782	3.4443571
2717	3.4340896	2750	3.4393327	2783	3.4445132
2718	3.4342494	2751	3.4394906	2784	3.4446692
2719	3.4344092	2752	3.4396484	2785	3.4448252
2720	3.4345689	2753	3.4398062	2786	3.4449811
2721	3.4347285	2754	3.4399639	2787	3.4451370
2722	3.4348881	2755	3.4401216	2788	3.4452928
2723	3.4350476	2756	3.4402792	2789	3.4454485
2724	3.4352071	2757	3.4404368	2790	3.4456042
2725	3.4353665	2758	3.4405943	2791	3.4457598
2726	3.4355258	2759	3.4407517	2792	3.4459154
2727	3.4356851	2760	3.4409091	2793	3.4460709
2728	3.4358444	2761	3.4410664	2794	3.4462264
2729	3.4360035	2762	3.4412237	2795	3.4463818
2730	3.4361626	2763	3.4413809	2796	3.4465372
2731	3.4363217	2764	3.4415380	2797	3.4466925
2732	3.4364807	2765	3.4416951	2798	3.4468477
2733	3.4366396	2766	3.4418522	2799	3.4470029
2734	3.4367985	2767	3.4420092	2800	3.4471580

Num	Logarithm	Num	Logarithm	Num	Logarithm
2801	3.4473131	2834	3.4523998	2867	3.4574277
2802	3.4474681	2835	3.4525531	2868	3.4575791
2803	3.4476231	2836	3.4527062	2869	3.4577305
2804	3.4477780	2837	3.4528593	2870	3.4578819
2805	3.4479329	2838	3.4530124	2871	3.4580332
2806	3.4480877	2839	3.4531654	2872	3.4581844
2807	3.4482424	2840	3.4533183	2873	3.4583356
2808	3.4483971	2841	3.4534712	2874	3.4584867
2809	3.4485517	2842	3.4536241	2875	3.4586378
2810	3.4487063	2843	3.4537769	2876	3.4587889
2811	3.4488608	2844	3.4539296	2877	3.4589399
2812	3.4490153	2845	3.4540823	2878	3.4590908
2813	3.4491697	2846	3.4542349	2879	3.4592417
2814	3.4493241	2847	3.4543875	2880	3.4593925
2815	3.4494784	2848	3.4545400	2881	3.4595433
2816	3.4496326	2849	3.4546924	2882	3.4596940
2817	3.4497868	2850	3.4548449	2883	3.4598446
2818	3.4499410	2851	3.4549972	2884	3.4599953
2819	3.4500951	2852	3.4551495	2885	3.4601458
2820	3.4502491	2853	3.4553018	2886	3.4602963
2821	3.4504031	2854	3.4554540	2887	3.4604468
2822	3.4505570	2855	3.4556061	2888	3.4605972
2823	3.4507109	2856	3.4557582	2889	3.4607475
2824	3.4508647	2857	3.4559102	2890	3.4608978
2825	3.4510184	2858	3.4560622	2891	3.4610481
2826	3.4511721	2859	3.4562142	2892	3.4611983
2827	3.4513258	2860	3.4563660	2893	3.4613484
2828	3.4514794	2861	3.4565179	2894	3.4614985
2829	3.4516329	2862	3.4566696	2895	3.4616486
2830	3.4517864	2863	3.4568213	2896	3.4617986
2831	3.4519399	2864	3.4569730	2897	3.4619485
2832	3.4520932	2865	3.4571246	2898	3.4620984
2833	3.4522466	2866	3.4572762	2899	3.4622482
2834	3.4523998	2867	3.4574277	2900	3.4623980

Num	Logarithm	Num	Logarithm	Num	Logarithm
2901	3.4625477	2934	3.4674601	2967	3.4723175
2902	3.4626974	2935	3.4676081	2968	3.5724639
2903	3.4628470	2936	3.4677560	2969	3.4726102
2904	3.4629966	2937	3.4679039	2970	3.4727564
2905	3.4631461	2938	3.4680518	2971	3.4729027
2906	3.4632956	2939	3.4681996	2972	3.4730488
2907	3.4634450	2940	3.5683473	2973	3.4731949
2908	3.4635944	2941	3.4684950	2974	3.4733410
2909	3.4637437	2942	3.4686427	2975	3.4734870
2910	3.4638930	2943	3.4687903	2976	3.4736329
2911	3.4640422	2944	3.4689378	2977	3.4737788
2912	3.4641914	2945	3.4690853	2978	3.4739247
2913	3.4643405	2946	3.4692327	2979	3.4740705
2914	3.4644895	2947	3.4693801	2980	3.4742163
2915	3.4646386	2948	3.4695275	2981	3.4743620
2916	3.4647875	2949	3.4696748	2982	3.4745076
2917	3.4649364	2950	3.4698220	2983	3.4746533
2918	3.4650853	2951	3.4699692	2984	3.4747988
2919	3.4652341	2952	3.4701163	2985	3.4749443
2920	3.4653828	2953	3.4702634	2986	3.4750898
2921	3.4655316	2954	3.4704105	2987	3.4752352
2922	3.4656802	2955	3.4705575	2988	3.4753806
2923	3.4658288	2956	3.4707044	2989	3.4755259
2924	3.4659774	2957	3.4708513	2990	3.4756712
2925	3.4661259	2958	3.4709982	2991	3.4758164
2926	3.4662743	2959	3.4711450	2992	3.4759616
2927	3.4664227	2960	3.4712917	2993	3.4761067
2928	3.4665711	2961	3.4714384	2994	3.4762518
2929	3.4667194	2962	3.4715851	2995	3.4763968
2930	3.4668675	2963	3.4717317	2996	3.4765418
2931	3.4670158	2964	3.4718782	2997	3.4766867
2932	3.4671640	2965	3.4720247	2998	3.4768316
2933	3.4673121	2966	3.4721711	2999	3.4769766
2934	3.4674601	2967	3.4723175	3000	3.477121

Num	Logarithm	Num	Logarithm	Num	Logarithm
3001	3.4772660	3034	3.4820156	3067	3.4867138
3002	3.4774107	3035	3.4821587	3068	3.4868554
3003	3.4775553	3036	3.4823018	3069	3.4869969
3004	3.4776999	3037	3.4824448	3070	3.4871384
3005	3.4778445	3038	3.4825878	3071	3.4872798
3006	3.4779890	3039	3.4827307	3072	3.4874212
3007	3.4781334	3040	3.4828736	3073	3.4875626
3008	3.4782778	3041	3.4830164	3074	3.4877039
3009	3.4784222	3042	3.4831592	3075	3.4878451
3010	3.4785665	3043	3.4833019	3076	3.4879863
3011	3.4787108	3044	3.4834446	3077	3.4881275
3012	3.4788550	3045	3.4835873	3078	3.4882686
3013	3.4789991	3046	3.4837299	3079	3.4884097
3014	3.4791432	3047	3.4838725	3080	3.4885507
3015	3.4792873	3048	3.4840150	3081	3.4886917
3016	3.4794313	3049	3.4841574	3082	3.4888326
3017	3.4795753	3050	3.4842998	3083	3.4889735
3018	3.4797192	3051	3.4844422	3084	3.4891144
3019	3.4798631	3052	3.4845845	3085	3.4892552
3020	3.4800069	3053	3.4847268	3086	3.4893959
3021	3.4801507	3054	3.4848690	3087	3.4895366
3022	3.4802945	3055	3.4850112	3088	3.4896773
3023	3.4804381	3056	3.4851533	3089	3.4898179
3024	3.4805818	3057	3.4852954	3090	3.4899585
3025	3.4807254	3058	3.4854375	3091	3.4900990
3026	3.4808689	3059	3.4855797	3092	3.4902395
3027	3.4810124	3060	3.4857214	3093	3.4903799
3028	3.4811559	3061	3.4858633	3094	3.4905203
3029	3.4812993	3062	3.4860052	3095	3.4906607
3030	3.4814426	3063	3.4861470	3096	3.4908009
3031	3.4815859	3064	3.4862888	3097	3.4909412
3032	3.4817292	3065	3.4864305	3098	3.4910814
3033	3.4818724	3066	3.4865721	3099	3.4912216
3034	3.4820156	3067	3.4867138	3000	3.4913617

Num	Logarithm	Num	Logarithm	Num	Logarithm
3101	3.4915018	3134	3.4960990	3167	3.5006481
3102	3.4916418	3135	3.4962375	3168	3.5007851
3103	3.4917818	3136	3.4963761	3169	3.5009222
3104	3.4919217	3137	3.4965145	3170	3.5010593
3105	3.4920616	3138	3.4966529	3171	3.5011962
3106	3.4922014	3139	3.4967913	3172	3.5013332
3107	3.4923413	3140	3.4969296	3173	3.5014701
3108	3.4924810	3141	3.4970679	3174	3.5016069
3109	3.4926207	3142	3.4972062	3175	3.5017437
3110	3.4927604	3143	3.4973444	3176	3.5018805
3111	3.4929000	3144	3.4974825	3177	3.5020172
3112	3.4930396	3145	3.4976208	3178	3.5021536
3113	3.4931791	3146	3.4977587	3179	3.5022905
3114	3.4933186	3147	3.4978967	3180	3.5024271
3115	3.4934580	3148	3.4980347	3181	3.5025637
3116	3.4935974	3149	3.4981727	3182	3.5027002
3117	3.4937368	3150	3.4983106	3183	3.5028366
3118	3.4938761	3151	3.4984484	3184	3.5029731
3119	3.4940154	3152	3.4985862	3185	3.5031094
3120	3.4941546	3153	3.4987240	3186	3.5032458
3121	3.4942938	3154	3.4988617	3187	3.5033821
3122	3.4944329	3155	3.4989994	3188	3.5035183
3123	3.4945720	3156	3.4991370	3189	3.5036545
3124	3.4947110	3157	3.4992746	3190	3.5037907
3125	3.4948500	3158	3.4994121	3191	3.5039268
3126	3.4949890	3159	3.4995496	3192	3.5040629
3127	3.4951279	3160	3.4996871	3193	3.5041989
3128	3.4952667	3161	3.4998245	3194	3.5043349
3129	3.4954056	3162	3.4999619	3195	3.5044709
3130	3.4955443	3163	3.5000992	3196	3.5046068
3131	3.4956831	3164	3.5002365	3197	3.5047426
3132	3.4958218	3165	3.5003737	3198	3.5048785
3133	3.4959604	3166	3.5005109	3199	3.5050142
3134	3.4960990	3167	3.5006481	3200	3.5051500

Num	Logarithm	Num	Logarithm	Num	Logarithm
3201	3.5052857	3234	3.5097400	3267	3.5141491
3202	3.5054213	3235	3.5098743	3268	3.5142820
3203	3.5055569	3236	3.5100085	3269	3.5144149
3204	3.5056925	3237	3.5101427	3270	3.5145478
3205	3.5058280	3238	3.5102768	3271	3.5146805
3206	3.5059635	3239	3.5104109	3272	3.5148133
3207	3.5060990	3240	3.5105450	3273	3.5149460
3208	3.5062344	3241	3.5106790	3274	3.5150787
3209	3.5063697	3242	3.5108130	3275	3.5152113
3210	3.5065050	3243	3.5109469	3276	3.5153439
3211	3.5066403	3244	3.5110808	3277	3.5154764
3212	3.5067755	3245	3.5112147	3278	3.5156089
3213	3.5069107	3246	3.5113485	3279	3.5157414
3214	3.5070459	3247	3.5114823	3280	3.5158738
3215	3.5071810	3248	3.5116160	3281	3.5160062
3216	3.5073160	3249	3.5117497	3282	3.5161386
3217	3.5074511	3250	3.5118834	3283	3.5162709
3218	3.5075860	3251	3.5120170	3284	3.5164031
3219	3.5077210	3252	3.5121505	3285	3.5165354
3220	3.5078559	3253	3.5122841	3286	3.5166676
3221	3.5079907	3254	3.5124175	3287	3.5167997
3222	3.5081255	3255	3.5125510	3288	3.5169318
3223	3.5082603	3256	3.5126844	3289	3.5170639
3224	3.5083950	3257	3.5128178	3290	3.5171959
3225	3.5085297	3258	3.5129511	3291	3.5173279
3226	3.5086644	3259	3.5130844	3292	3.5174598
3227	3.5087990	3260	3.5132176	3293	3.5175917
3228	3.5089335	3261	3.5133508	3294	3.5177236
3229	3.5090680	3262	3.5134840	3295	3.5178554
3230	3.5092025	3263	3.5136171	3296	3.5179872
3231	3.5093370	3264	3.5137501	3297	3.5181189
3232	3.5094713	3265	3.5138832	3298	3.5182506
3233	3.5096057	3266	3.5140162	3299	3.5183823
3234	3.5097400	3267	3.5141491	3200	3.5185139

Num	Logarithm	Num	Logarithm	Num	Logarithm
3301	3.5186455	3334	3.5229656	3367	3.5272431
3302	3.5187771	3335	3.5230958	3368	3.5273721
3303	3.5189086	3336	3.5232260	3369	3.5275010
3304	3.5190400	3337	3.5233562	3370	3.5276299
3305	3.5191715	3338	3.5234863	3371	3.5277588
3306	3.5193028	3339	3.5236164	3372	3.5278876
3307	3.5194342	3340	3.5237465	3373	3.5280163
3308	3.5195655	3341	3.5238765	3374	3.5281451
3309	3.5196968	3342	3.5240064	3375	3.5282738
3310	3.5198280	3343	3.5241364	3376	3.5284024
3311	3.5199592	3344	3.5242663	3377	3.5285311
3312	3.5200903	3345	3.5243961	3378	3.5286596
3313	3.5202214	3346	3.5245259	3379	3.5287882
3314	3.5203525	3347	3.5246557	3380	3.5289167
3315	3.5204835	3348	3.5247854	3381	3.5290452
3316	3.5206145	3349	3.5249151	3382	3.5291736
3317	3.5207455	3350	3.5250448	3383	3.5293020
3318	3.5208764	3351	3.5251744	3384	3.5294303
3319	3.5210073	3352	3.5253040	3385	3.5295587
3320	3.5211381	3353	3.5254335	3386	3.5296869
3321	3.5212689	3354	3.5255631	3387	3.5298152
3322	3.5213996	3355	3.5256925	3388	3.5299434
3323	3.5215303	3356	3.5258219	3389	3.5300716
3324	3.5216610	3357	3.5259513	3390	3.5301997
3325	3.5217916	3358	3.5260807	3391	3.5303278
3326	3.5219222	3359	3.5262100	3392	3.5304558
3327	3.5220528	3360	3.5263393	3393	3.5305839
3328	3.5221833	3361	3.5264685	3394	3.5307118
3329	3.5223138	3362	3.5265977	3395	3.5308398
3330	3.5224442	3363	3.5267269	3396	3.5309677
3331	3.5225746	3364	3.5268560	3397	3.5310955
3332	3.5227050	3365	3.5269851	3398	3.5312234
3333	3.5228353	3366	3.5271141	3399	3.5313512
3334	3.5229656	3367	3.5272431	3300	3.5314789

3400

Num	Logarithm	Num	Logarithm	Num	Logarithm
3401	3.5316066	3434	3.5358003	3467	3.5399538
3402	3.5317343	3435	3.5359267	3468	3.5400791
3403	3.5318619	3436	3.5360532	3469	3.5402043
3404	3.5319895	3437	3.5361795	3470	3.5403295
3405	3.5321171	3438	3.5363059	3471	3.5404546
3406	3.5322446	3439	3.5364322	3472	3.5405797
3407	3.5323721	3440	3.5365584	3473	3.5407048
3408	3.5324996	3441	3.5366847	3474	3.5408298
3409	3.5326270	3442	3.5368109	3475	3.5409548
3410	3.5327544	3443	3.5369370	3476	3.5410798
3411	3.5328817	3444	3.5370631	3477	3.5412047
3412	3.5330090	3445	3.5371892	3478	3.5413296
3413	3.5331363	3446	3.5373153	3479	3.5414544
3414	3.5332635	3447	3.5374413	3480	3.5415792
3415	3.5333907	3448	3.5375672	3481	3.5417040
3416	3.5335179	3449	3.5376932	3482	3.5418288
3417	3.5336450	3450	3.5378191	3483	3.5419535
3418	3.5337721	3451	3.5379450	3484	3.5420781
3419	3.5338991	3452	3.5380708	3485	3.5422028
3420	3.5340261	3453	3.5381966	3486	3.5423274
3421	3.5341531	3454	3.5383223	3487	3.5424519
3422	3.5342800	3455	3.5384481	3488	3.5425765
3423	3.5344069	3456	3.5385737	3489	3.5427010
3424	3.5345338	3457	3.5386994	3490	3.5428254
3425	3.5346606	3458	3.5388250	3491	3.5429498
3426	2.5347874	3459	3.5389506	3492	3.5430742
3427	3.5349141	3460	3.5390761	3493	3.5431986
3428	3.5350408	3461	3.5392016	3494	3.5433229
3429	3.5351675	3462	3.5393271	3495	3.5434472
3430	3.5352941	3463	3.5394525	3496	3.5435714
3431	3.5354207	3464	3.5395779	3497	3.5436956
3432	3.5355473	3465	3.5397032	3498	3.5438198
3433	3.5356738	3466	3.5398286	3499	3.5439439
3434	3.5358003	3467	3.5399538	3500	3.5440680

3500

Num Logarithm		Num Logarithm		Num Logarithm	
3501	3.5441921	3534	3.5482665	3567	3.5523031
3502	3.5443161	3535	3.5483894	3568	3.5524248
3503	3.5444401	3536	3.5485123	3569	3.5525465
3504	3.5445641	3537	3.5486351	3570	3.5526682
3505	3.5446880	3538	3.5487578	3571	3.5527898
3506	3.5448119	3539	3.5488806	3572	3.5529114
3507	3.5449358	3540	3.5490033	3573	3.5530330
3508	3.5450596	3541	3.5491259	3574	3.5531545
3509	3.5451834	3542	3.5492486	3575	3.5532760
3510	3.5453071	3543	3.5493712	3576	3.5533975
3511	3.5454308	3544	3.5494937	3577	3.5535189
3512	3.5455545	3545	3.5496162	3578	3.5536403
3513	3.5456781	3546	3.5497387	3579	3.5537617
3514	3.5458018	3547	3.5498612	3580	3.5538830
3515	3.5459253	3548	3.5499836	3581	3.5540043
3516	3.5460489	3549	3.5501060	3582	3.5541256
3517	3.5461724	3550	3.5502283	3583	3.5542468
3518	3.5462958	3551	3.5503507	3584	3.5543680
3519	3.5464193	3552	3.5504730	3585	3.5544892
3520	3.5465427	3553	3.5505952	3586	3.5546103
3521	3.5466660	3554	3.5507174	3587	3.5547314
3522	3.5467894	3555	3.5508396	3588	3.5548524
3523	3.5469126	3556	3.5509618	3589	3.5549735
3524	3.5470359	3557	3.5510839	3590	3.5550944
3525	3.5471591	3558	3.5512059	3591	3.5552154
3526	3.5472823	3559	3.5513280	3592	3.5553363
3527	3.5474055	3560	3.5514500	3593	3.5554572
3528	3.5475286	3561	3.5515720	3594	3.5555781
3529	3.5476517	3562	3.5516939	3595	3.5556989
3530	3.5477747	3563	3.5518158	3596	3.5558197
3531	3.5478977	3564	3.5519377	3597	3.5559404
3532	3.5480207	3565	3.5520595	3598	3.5560612
3533	3.5481436	3566	3.5521813	3599	3.5561818
3534	3.5482665	3567	3.5523031	3600	3.5563025

Num	Logarithm	Num	Logarithm	Num	Logarithm
3601	3.5564231	3634	3.5603849	3667	3.5643109
3602	3.5565437	3635	3.5605044	3668	3.5644293
3603	3.5566643	3636	3.5606239	3669	3.5645477
3604	3.5567848	3637	3.5607433	3670	3.5646661
3605	3.5569053	3638	3.5608627	3671	3.5647844
3606	3.5570257	3639	3.5609820	3672	3.5649027
3607	3.5571461	3640	3.5611014	3673	3.5650209
3608	3.5572665	3641	3.5612207	3674	3.5651392
3609	3.5573869	3642	3.5613399	3675	3.5652573
3610	3.5575072	3643	3.5614592	3676	3.5653755
3611	3.5576275	3644	3.5615784	3677	3.5654936
3612	3.5577477	3645	3.5616975	3678	3.5656117
3613	3.5578680	3646	3.5618167	3679	3.5657298
3614	3.5579881	3647	3.5619358	3680	3.5658478
3615	3.5581083	3648	3.5620548	3681	3.5659658
3616	3.5582284	3649	3.5621739	3682	3.5660838
3617	3.5583485	3650	3.5622929	3683	3.5662017
3618	3.5584686	3651	3.5624118	3684	3.5663196
3619	3.5585886	3652	3.5625308	3685	3.5664375
3620	3.5587086	3653	3.5626497	3686	3.5665553
3621	3.5588285	3654	3.5627685	3687	3.5666731
3622	3.5589484	3655	3.5628874	3688	3.5667909
3623	3.5590683	3656	3.5630062	3689	3.5669087
3624	3.5591882	3657	3.5631250	3690	3.5670264
3625	3.5593080	3658	3.5632437	3691	3.5671440
3626	3.5594278	3659	3.5633624	3692	3.5672617
3627	3.5595476	3660	3.5634811	3693	3.5673793
3628	3.5596673	3661	3.5635997	3694	3.5674969
3629	3.5597870	3662	3.5637183	3695	3.5676144
3630	3.5599066	3663	3.5638369	3696	3.5677320
3631	3.5600262	3664	3.5639555	3697	3.5678494
3632	3.5601458	3665	3.5640740	3698	3.5679669
3633	3.5602654	3666	3.5641925	3699	3.5680843
3634	3.5603849	3667	3.5643109	3700	3.5682017

Num Logarithm	Num Logarithm	Num Logarithm
3701 3.5683191	3734 3.5721743	3767 3.5759956
3702 3.5684364	3735 3.5722906	3768 3.5761109
3703 3.5685537	3736 3.5724069	3769 3.5762261
3704 3.5686710	3737 3.5725231	3770 3.5763413
3705 3.5687882	3738 3.5726393	3771 3.5764565
3706 3.5689054	3739 3.5727555	3772 3.5765717
3707 3.5690226	3740 3.5728716	3773 3.5766868
3708 3.5691397	3741 3.5729877	3774 3.5768019
3709 3.5692568	3742 3.5731038	3775 3.5769169
3710 3.5693739	3743 3.5732198	3776 3.5770320
3711 3.5694910	3744 3.5733358	3777 3.5771470
3712 3.5696080	3745 3.5734518	3778 3.5772620
3713 3.5697249	3746 3.5735678	3779 3.5773769
3714 3.5698419	3747 3.5736837	3780 3.5774918
3715 3.5699588	3748 3.5737996	3781 3.5776067
3716 3.5700757	3749 3.5739154	3782 3.5777215
3717 3.5701925	3750 3.5740313	3783 3.5778363
3718 3.5703094	3751 3.5741471	3784 3.5779511
3719 3.5704262	3752 3.5742628	3785 3.5780659
3720 3.5705429	3753 3.5743786	3786 3.5781806
3721 3.5706597	3754 3.5744943	3787 3.5782953
3722 3.5707764	3755 3.5746099	3788 3.5784100
3723 3.5708930	3756 3.5747256	3789 3.5785246
3724 3.5710097	3757 3.5748412	3790 3.5786392
3725 3.5711263	3758 3.5749568	3791 3.5787538
3726 2.5712428	3759 3.5750723	3792 3.5788683
3727 3.5713594	3760 3.5751878	3793 3.5789828
3728 3.5714759	3761 3.5753033	3794 3.5790973
3729 3.5715924	3762 3.5754188	3795 3.5792118
3730 3.5717088	3763 3.5755342	3796 3.5793263
3731 3.5718252	3764 3.5756496	3797 3.5794408
3732 3.5719416	3765 3.5757650	3798 3.5795553
3733 3.5720580	3766 3.5758803	3799 3.5796698
3734 3.5721743	3767 3.5759956	3800 3.5797843

3800

Num	Logarithm	Num	Logarithm	Num	Logarithm
3801	3.5798979	3834	3.5836521	3867	3.5873742
3802	3.5800121	3835	3.5837654	3868	3.5874865
3803	3.5801263	3836	3.5838736	3869	3.5875987
3804	3.5802405	3837	3.5839918	3870	3.5877110
3805	3.5803547	3838	3.5841050	3871	3.5878232
3806	3.5804688	3839	3.5842181	3872	3.5879353
3807	3.5805829	3840	3.5843312	3873	3.5880475
3808	3.5806969	3841	3.5844443	3874	3.5881596
3809	3.5808110	3842	3.5845574	3875	3.5882717
3810	3.5809250	3843	3.5846704	3876	3.5883838
3811	3.5810389	3844	3.5847834	3877	3.5884958
3812	3.5811529	3845	3.5848963	3878	3.5886078
3813	3.5812668	3846	3.5850093	3879	3.5887198
3814	3.5813807	3847	3.5851222	3880	3.5888317
3815	3.5814945	3848	3.5852351	3881	3.5889436
3816	3.5816084	3849	3.5853479	3882	3.5890555
3817	3.5817222	3850	3.5854607	3883	3.5891674
3818	3.5818359	3851	3.5855735	3884	3.5892792
3819	3.5819497	3852	3.5856863	3885	3.5893910
3820	3.5820634	3853	3.5857990	3886	3.5895028
3821	3.5821770	3854	3.5859117	3887	3.5896145
3822	3.5822907	3855	3.5860244	3888	3.5897262
3823	3.5824043	3856	3.5861350	3889	3.5898370
3824	3.5815179	3857	3.5862496	3890	3.5899496
3825	3.5826314	3858	3.5863622	3891	3.5900612
3826	3.5827450	3859	3.5864748	3892	3.5901728
3827	3.5828585	3860	3.5865873	3893	3.5902844
3828	3.5829719	3861	3.5866998	3894	3.5903959
3829	3.5830854	3862	3.5868123	3895	3.5905075
3830	3.5831988	3863	3.5869247	3896	3.5906189
3831	3.5833122	3864	3.5870371	3897	3.5907304
3832	3.5834255	3865	3.5871495	3898	3.5908418
3833	3.5835388	3866	3.5872618	3899	3.5909532
3834	3.5836521	3867	3.5873742	3900	3.5910646

3900

Num	Logarithm	Num	Logarithm	Num	Logarithm
3901	3.5911759	3934	3.5948344	3967	3.5984622
3902	3.5912873	3935	3.5949447	3968	3.5985717
3903	3.5913985	3936	3.5950551	3969	3.5986811
3904	3.5915098	3937	3.5951654	3970	3.5987905
3905	3.5916210	3938	3.5952757	3971	3.5988999
3906	3.5917322	3939	3.5953860	3972	3.5990092
3907	3.5918434	3940	3.5954962	3973	3.5991186
3908	3.5919546	3941	3.5956064	3974	3.5992278
3909	3.5920657	3942	3.5957166	3975	3.5993371
3910	3.5921768	3943	3.5958268	3976	3.5994464
3911	3.5922878	3944	3.5959369	3977	3.5995556
3912	3.5923988	3945	3.5960470	3978	3.5996648
3913	3.5925098	3946	3.5961571	3979	3.5997739
3914	3.5926208	3947	3.5962671	3980	3.5998831
3915	3.5927318	3948	3.5963771	3981	3.5999922
3916	3.5928427	3949	3.5964871	3982	3.6001013
3917	3.5929536	3950	3.5965971	3983	3.6002103
3918	3.5930644	3951	3.5967070	3984	3.6003193
3919	3.5931753	3952	3.5968169	3985	3.6004283
3920	3.5932861	3953	3.5969268	3986	3.6005373
3921	3.5933968	3954	3.5970367	3987	3.6006462
3922	3.5935076	3955	3.5971465	3988	3.6007551
3923	3.5936183	3956	3.5972563	3989	3.6008640
3924	3.5937290	3957	3.5973660	3990	3.6009729
3925	3.5938397	3958	3.5974758	3991	3.6010817
3926	3.5939503	3959	3.5975855	3992	3.6011905
3927	3.5940609	3960	3.5976952	3993	3.6012993
3928	3.5941715	3961	3.5978048	3994	3.6014080
3929	3.5942820	3962	3.5979145	3995	3.6015168
3930	3.5943925	3963	3.5980241	3996	3.6016255
3931	3.5945030	3964	3.5981336	3997	3.6017341
3932	3.5946135	3965	3.5982432	3998	3.6018428
3933	3.5947239	3966	3.5983527	3999	3.6019514
3934	3.5948344	3967	3.5984622	4000	3.6020600

4000

4000

Num	Logarithm	Num	Logarithm	Num	Logarithm
4001	3.6021685	4034	3.6057359	4067	3.6092742
4002	3.6022771	4035	3.6058435	4068	3.6093809
4003	3.6023856	4036	3.6059512	4069	3.6094877
4004	3.6024941	4037	3.6060587	4070	3.6095944
4005	3.6026025	4038	3.6061663	4071	3.6097011
4006	3.6027109	4039	3.6062738	4072	3.6098078
4007	3.6028193	4040	3.6063814	4073	3.6099144
4008	3.6029277	4041	3.6064888	4074	3.6100210
4009	3.6030361	4042	3.6065963	4075	3.6101276
4010	3.6031444	4043	3.6067037	4076	3.6102342
4011	3.6032527	4044	3.6068111	4077	3.6103407
4012	3.6033609	4045	3.6069185	4078	3.6104472
4013	3.6034692	4046	3.6070259	4079	3.6105537
4014	3.6035774	4047	3.6071332	4080	3.6106602
4015	3.6036855	4048	3.6072405	4081	3.6107666
4016	3.6037937	4049	3.6073478	4082	3.6108730
4017	3.6039018	4050	3.6074550	4083	3.6109794
4018	3.6040099	4051	3.6075622	4084	3.6110857
4019	3.6041180	4052	3.6076694	4085	3.6111921
4020	3.6042261	4053	3.6077766	4086	3.6112984
4021	3.6043341	4054	3.6078837	4087	3.6114046
4022	3.6044421	4055	3.6079909	4088	3.6115109
4023	3.6045500	4056	3.6080979	4089	3.6116171
4024	3.6046580	4057	3.6082050	4090	3.6117233
4025	3.6047659	4058	3.6083120	4091	3.6118295
4026	3.6048738	4059	3.6084190	4092	3.6119356
4027	3.6049816	4060	3.6085260	4093	3.6120417
4028	3.6050895	4061	3.6086330	4094	3.6121478
4029	3.6051973	4062	3.6087399	4095	3.6122539
4030	3.6053050	4063	3.6088468	4096	3.6123599
4031	3.6054128	4064	3.6089537	4097	3.6124660
4032	3.6055205	4065	3.6090605	4098	3.6125720
4033	3.6056282	4066	3.6091674	4099	3.6126779
4034	3.6057359	4067	3.6092742	4100	3.6127839

Num	Logarithm	Num	Logarithm	Num	Logarithm
4101	3.6128898	4134	3.6163705	4167	3.6198235
4102	3.6129957	4135	3.6164755	4168	3.6199277
4103	3.6131015	4136	3.6165805	4169	3.6200319
4104	3.6132073	4137	3.6166855	4170	3.6201360
4105	3.6133132	4138	3.6167905	4171	3.6202402
4106	3.6134189	4139	3.6168954	4172	3.6203443
4107	3.6135248	4140	3.6170003	4173	3.6204484
4108	3.6136304	4141	3.6171052	4174	3.6205524
4109	3.6147361	4142	3.6172101	4175	3.6206565
4110	3.6138418	4143	3.6173149	4176	3.6207605
4111	3.6139475	4144	3.6174197	4177	3.6208645
4112	3.6140531	4145	3.6175245	4178	3.6209684
4113	3.6141587	4146	3.6176293	4179	3.6210724
4114	3.6142643	4147	3.6177340	4180	3.6211763
4115	3.6143698	4148	3.6178387	4181	3.5212802
4116	3.6144754	4149	3.6179434	4182	3.6213840
4117	3.6145809	4150	3.6180481	4183	3.6214879
4118	3.6146863	4151	3.6181527	4184	3.6215917
4119	3.6147918	4152	3.6182573	4185	3.6216955
4120	3.6148972	4153	3.6183619	4186	3.6217992
4121	3.6150026	4154	3.6184665	4187	3.6219030
4122	3.6151080	4155	3.6185710	4188	3.6220067
4123	3.6152133	4156	3.6186755	4189	3.6221104
4124	3.6153187	4157	3.6187800	4190	3.6222140
4125	3.6154240	4158	3.6188845	4191	3.6223177
4126	3.6155292	4159	3.6189889	4192	3.6224213
4127	3.6156345	4160	3.6190933	4193	3.6225249
4128	3.6157397	4161	3.6191974	4194	3.6226284
4129	3.6158449	4162	3.6193021	4195	3.6227320
4130	3.6159501	4163	3.6194064	4196	3.6228355
4131	3.6160552	4164	3.6195107	4197	3.6229390
4132	3.6161603	4165	3.6196150	4198	3.6230424
4133	3.6162654	4166	3.6197193	4199	3.6231459
4134	3.6163705	4167	3.6198234	4200	3.6232493

Num	Logarithm	Num	Logarithm	Num	Logarithm
4201	3.6233527	4234	3.6267509	4267	3.6301226
4202	3.6234560	4235	3.6268534	4268	3.6302244
4203	3.6235594	4236	3.6269559	4269	3.6303262
4204	3.6236627	4237	3.6270585	4270	3.6304279
4205	3.6237660	4238	3.6271610	4271	3.6305296
4206	3.6238693	4239	3.6272634	4272	3.6306312
4207	3.6239725	4240	3.6273659	4273	3.6308329
4208	3.6240757	4241	3.6274683	4274	3.6308345
4209	3.6241789	4242	3.6275707	4275	3.6309361
4210	3.6242821	4243	3.6276730	4276	3.6310377
4211	3.6243852	4244	3.6277754	4277	3.6311392
4212	3.6244883	4245	3.6278777	4278	3.6312408
4213	3.6245915	4246	3.6279800	4279	3.6313423
4214	3.6246945	4247	3.6280823	4280	3.6314438
4215	3.6247976	4248	3.6281845	4281	3.6315452
4216	3.6249006	4249	3.6282867	4282	3.6316467
4217	3.6250036	4250	3.6283889	4283	3.6317481
4218	3.6251066	4251	3.6284911	4284	3.6318495
4219	3.6252095	4252	3.6285933	4285	3.6319508
4220	3.6253124	4253	3.6286954	4286	3.6320522
4221	3.6254153	4254	3.6287975	4287	3.6321535
4222	3.6255182	4255	3.6288996	4288	3.6322548
4223	3.6256211	4256	3.6290016	4289	3.6323560
4224	3.6257239	4257	3.6291036	4290	3.6324573
4225	3.6258267	4258	3.6292057	4291	3.6325585
4226	3.6259295	4259	3.6293076	4292	3.6326597
4227	3.6260322	4260	3.6294096	4293	3.6327609
4228	3.6261350	4261	3.6295115	4294	3.6328620
4229	3.6262377	4262	3.6296134	4295	3.6329632
4230	3.6263404	4263	3.6297153	4296	3.6330643
4231	3.6264430	4264	3.6298172	4297	3.6331653
4232	3.6265457	4265	3.6299190	4298	3.6332664
4233	3.6266483	4266	3.6300208	4299	3.6333674
4234	3.6267509	4267	3.6301226	4300	3.6334685

Num	Logarithm	Num	Logarithm	Num	Logarithm
4301	3.6335694	4334	3.6368889	4367	3.6401832
4302	3.6336704	4335	3.6369891	4368	3.6402826
4303	3.6337713	4336	3.6370893	4369	3.6403820
4304	3.6338723	4337	3.6371894	4370	3.6404814
4305	3.6339732	4338	3.6372895	4371	3.6405808
4306	3.6340740	4339	3.6373896	4372	3.6406802
4307	3.6341749	4340	3.6374897	4373	3.6407795
4308	3.6342757	4341	3.6375898	4374	3.6408788
4309	3.6343765	4342	3.6376898	4375	3.6409781
4310	3.6344773	4343	3.6377898	4376	3.6410773
4311	3.6345780	4344	3.6378898	4377	3.6411765
4312	3.6346788	4345	3.6379898	4378	3.6412758
4313	3.6347795	4346	3.6380897	4379	3.6413749
4314	3.6348801	4347	3.6381896	4380	3.6414741
4315	3.6349808	4348	3.6382895	4381	3.6415733
4316	3.6350814	4349	3.6383894	4382	3.6416724
4317	3.6351820	4350	3.6384893	4383	3.6417715
4318	3.6352826	4351	3.6385891	4384	3.6418705
4319	3.6353832	4352	3.6386889	4385	3.6419696
4320	3.6354837	4353	3.6387887	4386	3.6420686
4321	3.6355843	4354	3.6388884	4387	3.6421676
4322	3.6356848	4355	3.6389882	4388	3.6422666
4323	3.6357852	4356	3.6390879	4389	3.6423656
4324	3.6358857	4357	3.6391876	4390	3.6424645
4325	3.6359861	4358	3.6392872	4391	3.6425634
4326	3.6360865	4359	3.6393869	4392	3.6426623
4327	3.6361869	4360	3.6394865	4393	3.6427612
4328	3.6362872	4361	3.6395861	4394	3.6428601
4329	3.6363876	4362	3.6396857	4395	3.6429589
4330	3.6364879	4363	3.6397852	4396	3.6430577
4331	3.6365882	4364	3.6398847	4397	3.6431565
4332	3.6366884	4365	3.6399842	4398	3.6432554
4333	3.6367887	4366	3.6400837	4399	3.643354
4334	3.6368889	4367	3.6401832	4400	3.6434527

Num	Logarithm	Num	Logarithm	Num	Logarithm
4401	3.6435514	4434	3.6467957	4467	3.6500160
4402	3.6436500	4435	3.6468936	4468	3.6501132
4403	3.6437487	4436	3.6469915	4469	3.6502104
4404	3.6438473	4437	3.6470894	4470	3.6503075
4405	3.6439459	4438	3.6471873	4471	3.6504047
4406	3.6440445	4439	3.6472851	4472	3.6505018
4407	3.6441430	4440	3.6473830	4473	3.6505989
4408	3.6442416	4441	3.6474808	4474	3.6506960
4409	3.6443401	4442	3.6475785	4475	3.6507930
4410	3.6444386	4443	3.6476763	4476	3.6508901
4411	3.6445371	4444	3.6477740	4477	3.6509871
4412	3.6446355	4445	3.6478718	4478	3.6510841
4413	3.6447339	4446	3.6479695	4479	3.6511811
4414	3.6448323	4447	3.6480671	4480	3.6512780
4415	3.6449307	4448	3.6481648	4481	3.6513749
4416	3.6450291	4449	3.6482624	4482	3.6514719
4417	3.6451274	4450	3.6483600	4483	3.6515687
4418	3.6452257	4451	3.6484576	4484	3.6516656
4419	3.6453240	4452	3.6485552	4485	3.6517624
4420	3.6454223	4453	3.6486527	4486	3.6518593
4421	3.6455205	4454	3.6487502	4487	3.6519561
4422	3.6456187	4455	3.6488477	4488	3.6520528
4423	3.6457169	4456	3.6489452	4489	3.6521496
4424	3.6458151	4457	3.6490426	4490	3.6522463
4425	3.6459133	4458	3.6491401	4491	3.6523430
4426	3.6460114	4459	3.6492375	4492	3.6524397
4427	3.6461095	4460	3.6493349	4493	3.6525364
4428	3.6462076	4461	3.6494322	4494	3.6526331
4429	3.6463057	4462	3.6495296	4495	3.6527297
4430	3.6464037	4463	3.6496269	4496	3.6528263
4431	3.6465017	4464	3.6497242	4497	3.6529229
4432	3.6465997	4465	3.6498215	4498	3.6530195
4433	3.6466977	4466	3.6499187	4499	3.6531160
4434	3.6467957	4467	3.6500160	4500	3.6532125

4500

Num	Logarithm	Num	Logarithm	Num	Logarithm
4501	3.6533090	4534	3.6564815	4567	3.6596310
4502	3.6534055	4535	3.6565773	4568	3.6597261
4503	3.6535019	4536	3.6566730	4569	3.6598212
4504	3.6535984	4537	3.6567688	4570	3.6599162
4505	3.6536948	4538	3.6568645	4571	3.6600112
4506	3.6537912	4539	3.6569602	4572	3.6601062
4507	3.6538876	4540	3.6570559	4573	3.6602012
4508	3.6539839	4541	3.6571515	4574	3.6602962
4509	3.6540802	4542	3.6572471	4575	3.6603911
4510	3.6541765	4543	3.6573427	4576	3.6604860
4511	3.6542728	4544	3.6574383	4577	3.6605809
4512	3.6543691	4545	3.6575339	4578	3.6606758
4513	3.6544653	4546	3.6576294	4579	3.6607706
4514	3.6545616	4547	3.6577250	4580	3.6608655
4515	3.6546578	4548	3.6578205	4581	3.6609603
4516	3.6547539	4549	3.6579159	4582	3.6610551
4517	3.6548501	4550	3.6580114	4583	3.6611499
4518	3.6549462	4551	3.6581068	4584	3.6612446
4519	3.6550422	4552	3.6582023	4585	3.6613393
4520	3.6551384	4553	3.6582976	4586	3.6614340
4521	3.6552345	4554	3.6583930	4587	3.6615287
4522	3.6553306	4555	3.6584884	4588	3.6616234
4523	3.6554266	4556	3.6585837	4589	3.6617181
4524	3.6555226	4557	3.6586790	4590	3.6618127
4525	3.6556186	4558	3.6587743	4591	3.6619073
4526	3.6557145	4559	3.6588696	4592	3.6620019
4527	3.6558105	4560	3.6589648	4593	3.6620964
4528	3.6559064	4561	3.6590601	4594	3.6621910
4529	3.6560023	4562	3.6591553	4595	3.6622855
4530	3.6560982	4563	3.6592505	4596	3.6623800
4531	3.6561941	4564	3.6593456	4597	3.6624744
4532	3.6562899	4565	3.6594408	4598	3.6625690
4533	3.6563857	4566	3.6595359	4599	3.6626634
4534	3.6564815	4567	3.6596310	4600	3.6627578

4600

Num	Logarithm	Num	Logarithm	Num	Logarithm
4601	3.6628522	4634	3.6659560	4667	3.6690378
4602	3.6629466	4635	3.6660497	4668	3.6691308
4603	3.6630410	4636	3.6661434	4669	3.6692239
4604	3.6631353	4637	3.6662371	4670	3.6693169
4605	3.6632296	4638	3.6663307	4671	3.6694099
4606	3.6633239	4639	3.6664244	4672	3.6695028
4607	3.6634182	4640	3.6665180	4673	3.6695958
4608	3.6635125	4641	3.6666116	4674	3.6696887
4609	3.6636067	4642	3.6667051	4675	3.6697816
4610	3.6637009	4643	3.6667987	4676	3.6698745
4611	3.6637951	4644	3.6668922	4677	3.6699674
4612	3.6638893	4645	3.6669857	4678	3.6700602
4613	3.6639835	4646	3.6670792	4679	3.6701530
4614	3.6640776	4647	3.6671727	4680	3.6702459
4615	3.6641717	4648	3.6672661	4681	3.6703386
4616	3.6642658	4649	3.6673595	4682	3.6704314
4617	3.6643599	4650	3.6674530	4683	3.6705242
4618	3.6644539	4651	3.6675463	4684	3.6706169
4619	3.6645480	4652	3.6676397	4685	3.6707096
4620	3.6646420	4653	3.6677331	4686	3.6708023
4621	3.6647360	4654	3.6678264	4687	3.6708950
4622	3.6648299	4655	3.6679197	4688	3.6709876
4623	3.6649239	4656	3.6680130	4689	3.6710802
4624	3.6650178	4657	3.6681062	4690	3.6711728
4625	3.6651117	4658	3.6681995	4691	3.6712654
4626	3.6652056	4659	3.6682927	4692	3.6713580
4627	3.6652995	4660	3.6683859	4693	3.6714506
4628	3.6653933	4661	3.6684791	4694	3.6715431
4629	3.6654872	4662	3.6685723	4695	3.6716356
4630	3.6655810	4663	3.6686654	4696	3.6717281
4631	3.6656748	4664	3.6687585	4697	3.6718206
4632	3.6657685	4665	3.6688516	4698	3.6719130
4633	3.6658623	4666	3.6689447	4699	3.6720054
4634	3.6659560	4667	3.6690378	4700	3.6720979

Num	Logarithm	Num	Logarithm	Num	Logarithm
4701	3.6721903	4734	3.6752283	4767	3.6782452
4702	3.6722826	4735	3.6753200	4768	3.6783362
4703	3.6723750	4736	3.6754117	4769	3.6784273
4704	3.6724673	4737	3.6755034	4770	3.6785184
4705	3.6725596	4738	3.6755951	4771	3.6786094
4706	3.6726519	4739	3.6756867	4772	3.6787004
4707	3.6727442	4740	3.6757783	4773	3.6787914
4708	3.6728365	4741	3.6758700	4774	3.6788824
4709	3.6729287	4742	3.6759615	4775	3.6789734
4710	3.6730209	4743	3.6760531	4776	3.6790643
4711	3.6731131	4744	3.6761447	4777	3.6791552
4712	3.6732053	4745	3.6762362	4778	3.6792461
4713	3.6732974	4746	3.6763277	4779	3.6793370
4714	3.6733896	4747	3.6764192	4780	3.6794279
4715	3.6734817	4748	3.6765107	4781	3.6795187
4716	3.6735738	4749	3.6766022	4782	3.6796096
4717	3.6736659	4750	3.6766936	4783	3.6797004
4718	3.6737579	4751	3.6767850	4784	3.6797912
4719	3.6738500	4752	3.6768764	4785	3.6798819
4720	3.6739420	4753	3.6769678	4786	3.6799727
4721	3.6740340	4754	3.6770592	4787	3.6800634
4722	3.6741260	4755	3.6771505	4788	3.6801541
4723	3.6742179	4756	3.6772418	4789	3.6802448
4724	3.6743099	4757	3.6773332	4790	3.6803355
4725	3.6744018	4758	3.6774244	4791	3.6804262
4726	3.6744937	4759	3.6775157	4792	3.6805168
4727	3.6745856	4760	3.6776069	4793	3.6806074
4728	3.6746775	4761	3.6776982	4794	3.6806980
4729	3.6747693	4762	3.6777894	4795	3.6807886
4730	3.6748611	4763	3.6778806	4796	3.6808792
4731	3.6749529	4764	3.6779718	4797	3.6809697
4732	3.6750447	4765	3.6780629	4798	3.6810602
4733	3.6751365	4766	3.6781540	4799	3.6811507
4734	3.6752283	4767	3.6782452	4800	3.6812412

Num	Logarithm	Num	Logarithm	Num	Logarithm
4801	3.6813317	4834	3.6843066	4867	3.6872613
4802	3.6814222	4835	3.6843965	4868	3.6873506
4803	3.6815126	4836	3.6844863	4869	3.6874398
4804	3.6816030	4837	3.6845761	4870	3.6875290
4805	3.6816934	4838	3.6846659	4871	3.6876181
4806	3.6817838	4839	3.6847556	4872	3.6877073
4807	3.6818741	4840	3.6848454	4873	3.6877964
4808	3.6819645	4841	3.6849351	4874	3.6878855
4809	3.6820548	4842	3.6850248	4875	3.6879746
4810	3.6821451	4843	3.6851145	4876	3.6880637
4811	3.6822354	4844	3.6852041	4877	3.6881528
4812	3.6823256	4845	3.6852938	4878	3.6882418
4813	3.6824159	4846	3.6853834	4879	3.6883308
4814	3.6825061	4847	3.6854730	4880	3.6884198
4815	3.6825963	4848	3.6855626	4881	3.6885088
4816	3.6826865	4849	3.6856522	4882	3.6885978
4817	3.6827766	4850	3.6857417	4883	3.6886867
4818	3.6828668	4851	3.6858313	4884	3.6887756
4819	3.6829569	4852	3.6859208	4885	3.6888646
4820	3.6830470	4853	3.6860103	4886	3.6889535
4821	3.6831371	4854	3.6860998	4887	3.6890423
4822	3.6832272	4855	3.6861892	4888	3.6891312
4823	3.6833173	4856	3.6862787	4889	3.6892200
4824	3.6834073	4857	3.6863681	4890	3.6893089
4825	3.6834973	4858	3.6864575	4891	3.6893977
4826	3.6835873	4859	3.6865469	4892	3.6894864
4827	3.6836773	4860	3.6866363	4893	3.6895752
4828	3.6837673	4861	3.6867256	4894	3.6896640
4829	3.6838572	4862	3.6868149	4895	3.6897527
4830	3.6839471	4863	3.6869043	4896	3.6898414
4831	3.6840370	4864	3.6869936	4897	3.6899301
4832	3.6841269	4865	3.6870828	4898	3.6900188
4833	3.6842168	4866	3.6871721	4899	3.6901074
4834	3.6843066	4867	3.6872613	4900	3.6901961

Num	Logarithm	Num	Logarithm	Num	Logarithm
4901	3.6902847	4934	3.6931991	4967	3.6960942
4902	3.6903733	4935	3.6932872	4968	3.6961816
4903	3.6904619	4936	3.6933752	4969	3.6962690
4904	3.6905505	4937	3.6934631	4970	3.6963564
4905	3.6906390	4938	3.6935511	4971	3.6964438
4906	3.6907275	4939	3.6936390	4972	3.6965311
4907	3.6908161	4940	3.6937269	4973	3.6966185
4908	3.6909046	4941	3.6938148	4974	3.6967058
4909	3.6909930	4942	3.6939027	4975	3.6967931
4910	3.6910815	4943	3.6939906	4976	3.6968804
4911	3.6911699	4944	3.6940785	4977	3.6969676
4912	3.6912584	4945	3.6941663	4978	3.6970549
4913	3.6913468	4946	3.6942541	4979	3.6971421
4914	3.6914352	4947	3.6943419	4980	3.6972293
4915	3.6915235	4948	3.6944297	4981	3.6973165
4916	3.6916119	4949	3.6945174	4982	3.6974037
4917	3.6917002	4950	3.6946052	4983	3.6974909
4918	3.6917885	4951	3.6946929	4984	3.6975780
4919	3.6918768	4952	3.6947806	4985	3.6976652
4920	3.6919651	4953	3.6948683	4986	3.6977523
4921	3.6920534	4954	3.6949560	4987	3.6978394
4922	3.6921416	4955	3.6950437	4988	3.6979264
4923	3.6922298	4956	3.6951313	4989	3.6980135
4924	3.6923180	4957	3.6952189	4990	3.6981005
4925	3.6924062	4958	3.6953065	4991	3.6981876
4926	3.6924944	4959	3.6953941	4992	3.6982746
4927	3.6925826	4960	3.6954817	4993	3.6983616
4928	3.6926707	4961	3.6955692	4994	3.6984485
4929	3.6927588	4962	3.6956568	4995	3.6985355
4930	3.6928469	4963	3.6957443	4996	3.6986224
4931	3.6929350	4964	3.6958318	4997	3.6987093
4932	3.6930231	4965	3.6959193	4998	3.6987963
4933	3.6931111	4966	3.6960067	4999	3.6988831
4934	3.6931991	4967	3.6960942	5000	3.6989700

Num	Logarithm	Num	Logarithm	Num	Logarithm
5001	3.6990569	5034	3.7019132	5067	3.7047509
5002	3.6991437	5035	3.7019995	5068	3.7048366
5003	3.6992305	5036	3.7020857	5069	3.7049223
5004	3.6993173	5037	3.7021719	5070	3.7050080
5005	3.6494041	5038	3.7022582	5071	3.7050936
5006	3.6994908	5039	3.7023444	5072	3.7051792
5007	3.6995776	5040	3.7024305	5073	3.7052649
5008	3.6996643	5041	3.7025167	5074	3.7053505
5009	3.6997510	5042	3.7026028	5075	3.7054360
5010	3.6998377	5043	3.7026890	5076	3.7055216
5011	3.6999244	5044	3.7027751	5077	3.7056072
5012	3.7000111	5045	3.7028612	5078	3.7056927
5013	3.7000977	5046	3.7029472	5079	3.7057782
5014	3.7001843	5047	3.7030333	5080	3.7058637
5015	3.7002709	5048	3.7031193	5081	3.7059492
5016	3.7003575	5049	3.7032054	5082	3.7060347
5017	3.7004441	5050	3.7032914	5083	3.7061201
5018	3.7005307	5051	3.7033774	5084	3.7062055
5019	3.7006172	5052	3.7034633	5085	3.7062910
5020	3.7007037	5053	3.7035493	5086	3.7063764
5021	3.7007902	5054	3.7036352	5087	3.7064617
5022	3.7008767	5055	3.7037212	5088	3.7065471
5023	3.7009632	5056	3.7038071	5089	3.7066324
5024	3.7010469	5057	3.7038929	5090	3.7067178
5025	3.7011361	5058	3.7039788	5091	3.7068031
5026	3.7012225	5059	3.7040647	5092	3.7068884
5027	3.7013089	5060	3.7041505	5093	3.7069737
5028	3.7013953	5061	3.7042363	5094	3.7070589
5029	3.7014816	5062	3.7043221	5095	3.7071442
5030	3.7015680	5063	3.7044079	5096	3.7072294
5031	3.7016543	5064	3.7044937	5097	3.7073146
5032	3.7017406	5065	3.7045794	5098	3.7073998
5033	3.7018269	5066	3.7046652	5099	3.7074850
5034	3.7019132	5067	3.7047509	5100	3.7075702

5100

Num	Logarithm	Num	Logarithm	Num	Logarithm
5101	3.7076553	5134	3.7104559	5167	3.7132385
5102	3.7077405	5135	3.7105404	5168	3.7133225
5103	3.7078256	5136	3.7106250	5169	3.7134065
5104	3.7079107	5137	3.7107096	5170	3.7134905
5105	3.7079957	5138	3.7107941	5171	3.7135745
5106	3.7080808	5139	3.7108786	5172	3.7136585
5107	3.7081659	5140	3.7109631	5173	3.7137425
5108	3.7082509	5141	3.7110476	5174	3.7138264
5109	3.7083359	5142	3.7111321	5175	3.7139104
5110	3.7084209	5143	3.7112165	5176	3.7139943
5111	3.7085059	5144	3.7113010	5177	3.7140782
5112	3.7085908	5145	3.7113854	5178	3.7141620
5113	3.7086758	5146	3.7114698	5179	3.7142459
5114	3.7087607	5147	3.7115542	5180	3.7143298
5115	3.7088456	5148	3.7116385	5181	3.7144136
5116	3.7089305	5149	3.7117229	5182	3.7144974
5117	3.7090154	5150	3.7118072	5183	3.7145812
5118	3.7091003	5151	3.7118915	5184	3.7146650
5119	3.7091851	5152	3.7119759	5185	3.7147488
5120	3.7092700	5153	3.7120601	5186	3.7148325
5121	3.7093548	5154	3.7121444	5187	3.7149162
5122	3.7094396	5155	3.7122287	5188	3.7150000
5123	3.7095244	5156	3.7123129	5189	3.7150837
5124	3.7096091	5157	3.7123971	5190	3.7151674
5125	3.7096939	5158	3.7124813	5191	3.7152510
5126	3.7097786	5159	3.7125655	5192	3.7153347
5127	3.7098633	5160	3.7126497	5193	3.7154183
5128	3.7099480	5161	3.7127339	5194	3.7155019
5129	3.7100327	5162	3.7128180	5195	3.7155856
5130	3.7101174	5163	3.7129021	5196	3.7156691
5131	3.7102020	5164	3.7129862	5197	3.7157527
5132	3.7102866	5165	3.7130703	5198	3.7158363
5133	3.7103713	5166	3.7131544	5199	3.7159198
5134	3.7104559	5167	3.7132385	5200	3.7160033

Num	Logarithm	Num	Logarithm	Num	Logarithm
5201	3.7160869	5234	3.7188337	5267	3.7215633
5202	3.7161703	5235	3.7189167	5268	3.7216458
5203	3.7162538	5236	3.7189996	5269	3.7217282
5204	3.7163373	5237	3.7190826	5270	3.7218106
5205	3.7164207	5238	3.7191655	5271	3.7218930
5206	3.7165042	5239	3.7192484	5272	3.7219754
5207	3.7165876	5240	3.7193313	5273	3.7220578
5208	3.7166710	5241	3.7194142	5274	3.7221401
5209	3.7167544	5242	3.7194970	5275	3.7222225
5210	3.7168377	5243	3.7195799	5276	3.7223048
5211	3.7169211	5244	3.7196627	5277	3.7223871
5212	3.7170044	5245	3.7197455	5278	3.7224694
5213	3.7170877	5246	3.7198283	5279	3.7225517
5214	3.7171710	5247	3.7199111	5280	3.7226339
5215	3.7172543	5248	3.7199938	5281	3.7227162
5216	3.7173376	5249	3.7200766	5282	3.7227984
5217	3.7174208	5250	3.7201593	5283	3.7228806
5218	3.7175041	5251	3.7202420	5284	3.7229628
5219	3.7175873	5252	3.7203247	5285	3.7230450
5220	3.7176705	5253	3.7204074	5286	3.7231272
5221	3.7177537	5254	3.7204901	5287	3.7232093
5222	3.7278369	5255	3.7205727	5288	3.7232914
5223	3.7179200	5256	3.7206554	5289	3.7233736
5224	3.7180032	5257	3.7207380	5290	3.7234557
5225	3.7180863	5258	3.7208206	5291	3.7235378
5226	3.7181694	5259	3.7209032	5292	3.7236198
5227	3.7182525	5260	3.7209857	5293	3.7237019
5228	3.7183356	5261	3.7210683	5294	3.7237839
5229	3.7184186	5262	3.7211508	5295	3.7238660
5230	3.7185017	5263	3.7212334	5296	3.7239480
5231	3.7185847	5264	3.7213159	5297	3.7240300
5232	3.7186677	5265	3.7213984	5298	3.7241120
5233	3.7187507	5266	3.7214809	5299	3.7241939
5234	3.7188337	5267	3.7215633	5300	3.7242759

5300

Num	Logarithm	Num	Logarithm	Num	Logarithm
5301	3.7243578	5334	3.7270531	5367	3.7297516
5302	3.7244397	5335	3.7271344	5368	3.7298125
5303	3.7245216	5336	3.7272158	5369	3.7298734
5304	3.7246035	5337	3.7272972	5370	3.7299743
5305	3.7246854	5338	3.7273786	5371	3.7300551
5306	3.7247672	5339	3.7274599	5372	3.7301360
5307	3.7248491	5340	3.7275413	5373	3.7302168
5308	3.7249309	5341	3.7276226	5374	3.7302977
5309	3.7250127	5342	3.7277039	5375	3.7303785
5310	3.7250945	5343	3.7277852	5376	3.7304593
5311	3.7251763	5344	3.7278664	5377	3.7305400
5312	3.7252581	5345	3.7279477	5378	3.7306208
5313	3.7253398	5346	3.7280290	5379	3.7307015
5314	3.7254215	5347	3.7281101	5380	3.7307823
5315	3.7255033	5348	3.7281914	5381	3.7308630
5316	3.7255850	5349	3.7282726	5382	3.7309437
5317	3.7256667	5350	3.7283538	5383	3.7310244
5318	3.7257483	5351	3.7284349	5384	3.7311051
5319	3.7258300	5352	3.7285161	5385	3.7311857
5320	3.7259116	5353	3.7285972	5386	3.7312663
5321	3.7259933	5354	3.7286784	5387	3.7313470
5322	3.7260749	5355	3.7287595	5388	3.7314276
5323	3.7261565	5356	3.7288406	5389	3.7315082
5324	3.7262380	5357	3.7289216	5390	3.7315888
5325	3.7263196	5358	3.7290027	5391	3.7316693
5326	3.7264012	5359	3.7290838	5392	3.7317499
5327	3.7264827	5360	3.7291648	5393	3.7318304
5328	3.7265642	5361	3.7292458	5394	3.7319109
5329	3.7266457	5362	3.7293268	5395	3.7319914
5330	3.7267272	5363	3.7294078	5396	3.7320719
5331	3.7268087	5364	3.7294888	5397	3.7321524
5332	3.7268901	5365	3.7295697	5398	3.7322329
5333	3.7269716	5366	3.7296507	5399	3.7323133
5334	3.7270531	5367	3.7297316	5400	3.7323938

5400

5400

Num	Logarithm	Num	Logarithm	Num	Logarithm
5401	3.7324742	5434	3.7351196	5467	3.7377491
5402	3.7325546	5435	3.7351995	5468	3.7378285
5403	3.7326350	5436	3.7352794	5469	3.7379079
5404	3.7327153	5437	3.7353593	5470	3.7379873
5405	3.7327957	5438	3.7354392	5471	3.7380667
5406	3.7328760	5439	3.7355191	5472	3.7381461
5407	3.7329564	5440	3.7355989	5473	3.7382254
5408	3.7330367	5441	3.7356787	5474	3.7383048
5409	3.7331170	5442	3.7357585	5475	3.7383841
5410	3.7331973	5443	3.7358383	5476	3.7384634
5411	3.7332775	5444	3.7359181	5477	3.7385427
5412	3.7333578	5445	3.7359979	5478	3.7386220
5413	3.7334380	5446	3.7360776	5479	3.7387013
5414	3.7335182	5447	3.7361574	5480	3.7387806
5415	3.7335985	5448	3.7362371	5481	3.7388598
5416	3.7336787	5449	3.7363168	5482	3.7389390
5417	3.7337588	5450	3.7363965	5483	3.7390182
5418	3.7338390	5451	3.7364762	5484	3.7390974
5419	3.7339191	5452	3.7365558	5485	3.7391766
5420	3.7339993	5453	3.7366355	5486	3.7392558
5421	3.7340794	5454	3.7367151	5487	3.7393350
5422	3.7341595	5455	3.7367948	5488	3.7394141
5423	3.7342396	5456	3.7368744	5489	3.7394932
5424	3.7343197	5457	3.7369540	5490	3.7395723
5425	3.7343997	5458	3.7370335	5491	3.7396514
5426	3.7344798	5459	3.7371131	5492	3.7397305
5427	3.7345598	5460	3.7371926	5493	3.7398096
5428	3.7346398	5461	3.7372722	5494	3.7398886
5429	3.7347198	5462	3.7373517	5495	3.7399677
5430	3.7347998	5463	3.7374312	5496	3.7400467
5431	3.7348798	5464	3.7375107	5497	3.7401257
5432	3.7349598	5465	3.7375902	5498	3.7402047
5433	3.7350397	5466	3.7376696	5499	3.7402837
5434	3.7351196	5467	3.7377491	5500	3.7403625

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5500

Num	Logarithm	Num	Logarithm	Num	Logarithm
5501	3.7404416	5534	3.7430392	5567	3.7456212
5502	3.7405206	5535	3.7431176	5568	3.7456992
5503	3.7405995	5536	3.7431961	5569	3.7457772
5504	3.7406784	5537	3.7432745	5570	3.7458552
5505	3.7407573	5538	3.7433530	5571	3.7459332
5506	3.7408362	5539	3.7434314	5572	3.7460111
5507	3.7409151	5540	3.7435098	5573	3.7460890
5508	3.7409939	5541	3.7435881	5574	3.7461670
5509	3.7410728	5542	3.7436665	5575	3.7462449
5510	3.7411516	5543	3.7437449	5576	3.7463228
5511	3.7412304	5544	3.7438232	5577	3.7464006
5512	3.7413092	5545	3.7439015	5578	3.7464785
5513	3.7413880	5546	3.7439799	5579	3.7465564
5514	3.7414668	5547	3.7440582	5580	3.7466342
5515	3.7415455	5548	3.7441365	5581	3.7467120
5516	3.7416243	5549	3.7442147	5582	3.7467898
5517	3.7417030	5550	3.7442930	5583	3.7468676
5518	3.7417817	5551	3.7443712	5584	3.7469454
5519	3.7418604	5552	3.7444495	5585	3.7470232
5520	3.7419391	5553	3.7445277	5586	3.7471009
5521	3.7420177	5554	3.7446059	5587	3.7471787
5522	3.7420964	5555	3.7446841	5588	3.7472564
5523	3.7421750	5556	3.7447622	5589	3.7473341
5524	3.7422537	5557	3.7448404	5590	3.7474118
5525	3.7423323	5558	3.7449185	5591	3.7474895
5526	3.7424109	5559	3.7449967	5592	3.7475672
5527	3.7424895	5560	3.7450748	5593	3.7476448
5528	3.7425680	5561	3.7451529	5594	3.7477225
5529	3.7426466	5562	3.7452310	5595	3.7478001
5530	3.7427251	5563	3.7453091	5596	3.7478777
5531	3.7428037	5564	3.7453871	5597	3.7479553
5532	3.7428822	5565	3.7454652	5598	3.7480329
5533	3.7429607	5566	3.7455432	5599	3.7481105
5534	3.7430392	5567	3.7456212	5600	3.7481880

5600

Num	Logarithm	Num	Logarithm	Num	Logarithm
5601	3.7482656	5634	3.7508168	5667	3.7533532
5602	3.7483431	5635	3.7508939	5668	3.7534298
5603	3.7484206	5636	3.7509710	5669	3.7535065
5604	3.7484981	5637	3.7510480	5670	3.7535831
5605	3.7485756	5638	3.7511251	5671	3.7536596
5606	3.7486531	5639	3.7712021	5672	3.7537362
5607	3.7487306	5640	3.7512791	5673	3.7538128
5608	3.7488080	5641	3.7513561	5674	3.7538893
5609	3.7488854	5642	3.7514331	5675	3.7539659
5610	3.7489629	5643	3.7515100	5676	3.7540424
5611	3.7490403	5644	3.7515870	5677	3.7541189
5612	3.7491177	5645	3.7516639	5678	3.7541954
5613	3.7491950	5646	3.7517409	5679	3.7542719
5614	3.7492724	5647	3.7518178	5680	3.7543483
5615	3.7493498	5648	3.7518947	5681	3.7544248
5616	3.7494271	5649	3.7519716	5682	3.7545012
5617	3.7495044	5650	3.7520484	5683	3.7545777
5618	3.7495817	5651	3.7521253	5684	3.7546541
5619	3.7496590	5652	3.7522022	5685	3.7547305
5620	3.7497363	5653	3.7522790	5686	3.7548069
5621	3.7498136	5654	3.7523558	5687	3.7548832
5622	3.7498908	5655	3.7524326	5688	3.7549596
5623	3.7499681	5656	3.7525094	5689	3.7550359
5624	3.7500453	5657	3.7525862	5690	3.7551123
5625	3.7501225	5658	3.7526629	5691	3.7551886
5626	3.7501997	5659	3.7527397	5692	3.7552649
5627	3.7502769	5660	3.7528164	5693	3.7553412
5628	3.7503541	5661	3.7528932	5694	3.7554175
5629	3.7504312	5662	3.7529699	5695	3.7554937
5630	3.7505084	5663	3.7530466	5696	3.7555700
5631	3.7505855	5664	3.7531232	5697	3.7556462
5632	3.7506626	5665	3.7531999	5698	3.7557224
5633	3.7507398	5666	3.7532766	5699	3.7557987
5634	3.7508168	5667	3.7533532	5700	3.7558749

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5700

Num	Logarithm	Num	Logarithm	Num	Logarithm
5701	3.7559510	5734	3.7584577	5767	3.7609500
5702	3.7560272	5735	3.7585334	5768	3.7610223
5703	3.7561034	5736	3.7586091	5769	3.7611005
5704	3.7561795	5737	3.7586848	5770	3.7611758
5705	3.7562556	5738	3.7587605	5771	3.7612511
5706	3.7563318	5739	3.7788362	5772	3.7613263
5707	3.7564079	5740	3.7589119	5773	3.7614016
5708	3.7564841	5741	3.7589875	5774	3.7614768
5709	3.7565600	5742	3.7590632	5775	3.7615520
5710	3.7566361	5743	3.7591388	5776	3.7616272
5711	3.7567122	5744	3.7592144	5777	3.7617024
5712	3.7567882	5745	3.7592900	5778	3.7617775
5713	3.7568642	5746	3.7593656	5779	3.7618527
5714	3.7569402	5747	3.7594412	5780	3.7619278
5715	3.7570162	5748	3.7595168	5781	3.7620030
5716	3.7570922	5749	3.7595923	5782	3.7620781
5717	3.7571682	5750	3.7596678	5783	3.7621532
5718	3.7572441	5751	3.7597434	5784	3.7622283
5719	3.7573201	5752	3.7598189	5785	3.7623034
5720	3.7573960	5753	3.7598944	5786	3.7623784
5721	3.7574719	5754	3.7599699	5787	3.7624535
5722	3.7575479	5755	3.7600453	5788	3.7625285
5723	3.7576237	5756	3.7601208	5789	3.7626035
5724	3.7576996	5757	3.7601962	5790	3.7626786
5725	3.7577755	5758	3.7602717	5791	3.7627536
5726	3.7578513	5759	3.7603471	5792	3.7628286
5727	3.7579272	5760	3.7604225	5793	3.7629035
5728	3.7580030	5761	3.7604979	5794	3.7629785
5729	3.7580788	5762	3.7605733	5795	3.7630534
5730	3.7581546	5763	3.7606486	5796	3.7631284
5731	3.7582304	5764	3.7607240	5797	3.7632033
5732	3.7583062	5765	3.7607993	5798	3.7632782
5733	3.7583819	5766	3.7608746	5799	3.7633531
5734	3.7584577	5767	3.7609500	5800	3.7634280

5800

Num	Logarithm	Num	Logarithm	Num	Logarithm
5801	3.7635029	5834	3.7659664	5867	3.7684161
5802	3.7635777	5835	3.7660409	5868	3.7684901
5803	3.7636526	5836	3.7661153	5869	3.7685641
5804	3.7637274	5837	3.7661897	5870	3.7686381
5805	3.7638022	5838	3.7662642	5871	3.7687121
5806	3.7638770	5839	3.7663385	5872	3.7687860
5807	3.7639518	5840	3.7664128	5873	3.7688600
5808	3.7640266	5841	3.7664872	5874	3.7689339
5809	3.7641014	5842	3.7665616	5875	3.7690079
5810	3.7641761	5843	3.7666359	5876	3.7690818
5811	3.7642509	5844	3.7667102	5877	3.7691557
5812	3.7643256	5845	3.7667845	5878	3.7692296
5813	3.7644003	5846	3.7668588	5879	3.7693035
5814	3.7644750	5847	3.7669331	5880	3.7693773
5815	3.7645497	5848	3.7670074	5881	3.7694512
5816	3.7646244	5849	3.7670815	5882	3.7695250
5817	3.7646991	5850	3.7671559	5883	3.7695988
5818	3.7647737	5851	3.7672301	5884	3.7696727
5819	3.7648484	5852	3.7673043	5885	3.7697465
5820	3.7649230	5853	3.7673785	5886	3.7698203
5821	3.7649976	5854	3.7674527	5887	3.7698940
5822	3.7650722	5855	3.7675269	5888	3.7699678
5823	3.7651468	5856	3.7676011	5889	3.7700416
5824	3.7652214	5857	3.7676752	5890	3.7701153
5825	3.7652959	5858	3.7677494	5891	3.7701890
5826	3.7653705	5859	3.7678235	5892	3.7702627
5827	3.7654450	5860	3.7678976	5893	3.7703364
5828	3.7655195	5861	3.7679717	5894	3.7704101
5829	3.7655941	5862	3.7680458	5895	3.7704838
5830	3.7656686	5863	3.7681199	5896	3.7705575
5831	3.7657430	5864	3.7681940	5897	3.7706311
5832	3.7658175	5865	3.7682680	5898	3.7707048
5833	3.7658920	5866	3.7683421	5899	3.7707784
5834	3.7659664	5867	3.7684161	5900	3.7708520

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5900

Num	Logarithm	Num	Logarithm	Num	Logarithm
5901	3.7709256	5934	3.7733475	5967	3.7757560
5902	3.7709292	5935	3.7734207	5968	3.7758288
5903	3.7710728	5936	3.7734939	5969	3.7759016
5904	3.7711463	5937	3.7735670	5970	3.7759743
5905	3.7712199	5938	3.7736402	5971	3.7760471
5906	3.7712934	5939	3.7737133	5972	3.7761198
5907	3.7713670	5940	3.7737864	5973	3.7761925
5908	3.7714405	5941	3.7738596	5974	3.7762652
5909	3.7715140	5942	3.7739326	5975	3.7763379
5910	3.7715875	5943	3.7740057	5976	3.7764106
5911	3.7716610	5944	3.7740788	5977	3.7764833
5912	3.7717344	5945	3.7741519	5978	3.7765559
5913	3.7718079	5946	3.7742249	5979	3.7766286
5914	3.7718813	5947	3.7742979	5980	3.7767012
5915	3.7719547	5948	3.7743710	5981	3.7767738
5916	3.7720282	5949	3.7744440	5982	3.7768464
5917	3.7721016	5950	3.7745170	5983	3.7769190
5918	3.7721750	5951	3.7745899	5984	3.7769916
5919	3.7722483	5952	3.7746629	5985	3.7770642
5920	3.7723217	5953	3.7747359	5986	3.7771367
5921	3.7723951	5954	3.7748088	5987	3.7772093
5922	3.7724684	5955	3.7748818	5988	3.7772818
5923	3.7725417	5956	3.7749547	5989	3.7773543
5924	3.7726150	5957	3.7750276	5990	3.7774268
5925	3.7726884	5958	3.7751005	5991	3.7774993
5926	3.7727616	5959	3.7751734	5992	3.7775718
5927	3.7728349	5960	3.7752463	5993	3.7776443
5928	3.7729082	5961	3.7753191	5994	3.7777167
5929	3.7729814	5962	3.7753920	5995	3.7777892
5930	3.7730547	5963	3.7754648	5996	3.7778616
5931	3.7731279	5964	3.7755376	5997	3.7779340
5932	3.7732011	5965	3.7756104	5998	3.7780065
5933	3.7732743	5966	3.7756832	5999	3.7780789
5934	3.7733475	5967	3.7757560	6000	3.7781512

Num	Logarithm	Num	Logarithm	Num	Logarithm
6001	3.7782236	6034	3.7806053	6067	3.7829740
6002	3.7782960	6035	3.7806773	6068	3.7830456
6003	3.7783683	6036	3.7807492	6069	3.7831171
6004	3.7784407	6037	3.7808212	6070	3.7831887
6005	3.7785130	6038	3.7808931	6071	3.7832602
6006	3.7785853	6039	3.7809650	6072	3.7833318
6007	3.7786576	6040	3.7810369	6073	3.7834033
6008	3.7787299	6041	3.7811088	6074	3.7834748
6009	3.7788022	6042	3.7811807	6075	3.7835463
6010	3.7788745	6043	3.7812526	6076	3.7836178
6011	3.7789467	6044	3.7813245	6077	3.7836892
6012	3.7790190	6045	3.7813963	6078	3.7837607
6013	3.7790912	6046	3.7814681	6079	3.7838321
6014	3.7791634	6047	3.7815400	6080	3.7839036
6015	3.7792356	6048	3.7816118	6081	3.7839750
6016	3.7793078	6049	3.7816836	6082	3.7840464
6017	3.7793800	6050	3.7817554	6083	3.7841178
6018	3.7794522	6051	3.7818272	6084	3.7841892
6019	3.7795243	6052	3.7818989	6085	3.7842606
6020	3.7795965	6053	3.7819707	6086	3.7843319
6021	3.7796686	6054	3.7820424	6087	3.7844033
6022	3.7797408	6055	3.7821141	6088	3.7844746
6023	3.7798129	6056	3.7821859	6089	3.7845460
6024	3.7798851	6057	3.7822576	6090	3.7846173
6025	3.7799571	6058	3.7823293	6091	3.7846886
6026	3.7800291	6059	3.7824010	6092	3.7847599
6027	3.7801012	6060	3.7824726	6093	3.7848312
6028	3.7801732	6061	3.7825443	6094	3.7849024
6029	3.7802453	6062	3.7826159	6095	3.7849737
6030	3.7803173	6063	3.7826876	6096	3.7850450
6031	3.7803893	6064	3.7827592	6097	3.7851162
6032	3.7804613	6065	3.7828308	6098	3.7851874
6033	3.7805333	6066	3.7829024	6099	3.7852586
6034	3.7806053	6067	3.7829740	6100	3.7853298

Num	Logarithm	Num	Logarithm	Num	Logarithm
6101	3.7854010	6134	3.7877438	6167	3.7900739
6102	3.7854722	6135	3.7878146	6168	3.7901444
6103	3.7855434	6136	3.7878853	6169	3.7902148
6104	3.7856145	6137	3.7879561	6170	3.7902852
6105	3.7856857	6138	3.7880260	6171	3.7903555
6106	3.7857568	6139	3.7880976	6172	3.7904259
6107	3.7858279	6140	3.7881684	6173	3.7904963
6108	3.7858990	6141	3.7882391	6174	3.7905666
6109	3.7859701	6142	3.7883098	6175	3.7906370
6110	3.7860412	6143	3.7883805	6176	3.7907073
6111	3.7861123	6144	3.7884512	6177	3.7907776
6112	3.7861833	6145	3.7885219	6178	3.7908479
6113	3.7862544	6146	3.7885926	6179	3.7909182
6114	3.7863254	6147	3.7886632	6180	3.7909885
6115	3.7863965	6148	3.7887339	6181	3.7910587
6116	3.7864675	6149	3.7888045	6182	3.7911290
6117	3.7865385	6150	3.7888751	6183	3.7911992
6118	3.7866095	6151	3.7889457	6184	3.7912695
6119	3.7866805	6152	3.7890163	6185	3.7913397
6120	3.7867514	6153	3.7890869	6186	3.7914099
6121	3.7868224	6154	3.7891575	6187	3.7914801
6122	3.7868933	6155	3.7892281	6188	3.7915503
6123	3.7869643	6156	3.7892986	6189	3.7916205
6124	3.7870352	6157	3.7893691	6190	3.7916906
6125	3.7871061	6158	3.7894397	6191	3.7917608
6126	3.7871770	6159	3.7895102	6192	3.7918309
6127	3.7872479	6160	3.7895807	6193	3.7919011
6128	3.7873188	6161	3.7896512	6194	3.7919812
6129	3.7873896	6162	3.7897217	6195	3.7920413
6130	3.7874605	6163	3.7897922	6196	3.7921114
6131	3.7875313	6164	3.7898626	6197	3.7921815
6132	3.7876021	6165	3.7899331	6198	3.7922516
6133	3.7876730	6166	3.7900035	6199	3.7923216
6134	3.7877438	6167	3.7900739	6200	3.7923918

Num	Logarithm	Num	Logarithm	Num	Logarithm
6201	3.7924617	6234	3.7947668	6267	3.7970597
6202	3.7925318	6235	3.7948365	6268	3.7971290
6203	3.7926018	6236	3.7949061	6269	3.7971983
6204	3.7926718	6237	3.7949757	6270	3.7972675
6205	3.7927414	6238	3.7950454	6271	3.7973368
6206	3.7928118	6239	3.7951150	6272	3.7974060
6207	3.7928817	6240	3.7951846	6273	3.7974753
6208	3.7929517	6241	3.7952542	6274	3.7975445
6209	3.7930217	6242	3.7953238	6275	3.7976137
6210	3.7930916	6243	3.7953933	6276	3.7976829
6211	3.7931615	6244	3.7954629	6277	3.7977521
6212	3.7932314	6245	3.7955324	6278	3.7978213
6213	3.7933014	6246	3.7956020	6279	3.7978905
6214	3.7933712	6247	3.7956715	6280	3.7979596
6215	3.7934411	6248	3.7957410	6281	3.7980288
6216	3.7935110	6249	3.7958105	6282	3.7980975
6217	3.7935809	6250	3.7958800	6283	3.7981671
6218	3.7936507	6251	3.7959495	6284	3.7982362
6219	3.7937206	6252	3.7960190	6285	3.7983053
6220	3.7937904	6253	3.7960884	6286	3.7983744
6221	3.7938602	6254	3.7961579	6287	3.7984435
6222	3.7939300	6255	3.7962273	6288	3.7985125
6223	3.7939998	6256	3.7962967	6289	3.7985816
6224	3.7940696	6257	3.7963662	6290	3.7986506
6225	3.7941394	6258	3.7964356	6291	3.7987197
6226	3.7942091	6259	3.7965050	6292	3.7987887
6227	3.7942789	6260	3.7965743	6293	3.7988577
6228	3.7943486	6261	3.7966437	6294	3.7989267
6229	3.7944183	6262	3.7967131	6295	3.7989957
6230	3.7944880	6263	3.7967824	6296	3.7990647
6231	3.7945578	6264	3.7968517	6297	3.7991337
6232	3.7946274	6265	3.7969211	6298	3.7992027
6233	3.7946971	6266	3.7969904	6299	3.7992716
6234	3.7947668	6267	3.7970597	6300	3.7993405

Num	Logarithm	Num	Logarithm	Num	Logarithm
6301	3.7994095	6334	3.8016781	6367	3.8039348
6302	3.7994784	6335	3.8017466	6368	3.8040031
6303	3.7995473	6336	3.8018152	6369	3.8040712
6304	3.7996162	6337	3.8018837	6370	3.8041394
6305	3.7996851	6338	3.8019522	6371	3.8042076
6306	3.7997540	6339	3.8020208	6372	3.8042758
6307	3.7998228	6340	3.8020893	6373	3.8043435
6308	3.7998917	6341	3.8021578	6374	3.8044121
6309	3.7999605	6342	3.8022262	6375	3.8044802
6310	3.8000294	6343	3.8022947	6376	3.8045483
6311	3.8000982	6344	3.8023632	6377	3.8046164
6312	3.8001670	6345	3.8024316	6378	3.8046845
6313	3.8002358	6346	3.8025001	6379	3.8047526
6314	3.8003046	6347	3.8025685	6380	3.8048207
6315	3.8003734	6348	3.8026369	6381	3.8048887
6316	3.8004421	6349	3.8027053	6382	3.8049568
6317	3.8005109	6350	3.8027737	6383	3.8050248
6318	3.8005796	6351	3.8028421	6384	3.8050929
6319	3.8006484	6352	3.8029105	6385	3.8051609
6320	3.8007171	6353	3.8029789	6386	3.8052289
6321	3.8007858	6354	3.8030472	6387	3.8052969
6322	3.8008545	6355	3.8031156	6388	3.8053649
6323	3.8009232	6356	3.8031839	6389	3.8054329
6324	3.8009919	6357	3.8032522	6390	3.8055009
6325	3.8010605	6358	3.8033205	6391	3.8055688
6326	3.8011292	6359	3.8033888	6392	3.8056368
6327	3.8011978	6360	3.8034571	6393	3.8057047
6328	3.8012665	6361	3.8035254	6394	3.8057726
6329	3.8013351	6362	3.8035937	6395	3.8058405
6330	3.8014037	6363	3.8036619	6396	3.8059085
6331	3.8014723	6364	3.8037302	6397	3.8059763
6332	3.8015409	6365	3.8037984	6398	3.8060442
6333	3.8016095	6366	3.8038666	6399	3.8061121
6334	3.8016781	6367	3.8039348	6400	3.8061800

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Num	Logarithm	Num	Logarithm	Num	Logarithm
6401	3.8062478	6434	3.8084811	6467	3.8107029
6402	3.8063157	6435	3.8085485	6468	3.8107700
6403	3.8063835	6436	3.8086160	6469	3.8108371
6404	3.8064513	6437	3.8086835	6470	3.8109043
6405	3.8065191	6438	3.8087510	6471	3.8109714
6406	3.8065869	6439	3.8088184	6472	3.8110395
6407	3.8066547	6440	3.8088859	6473	3.8111056
6408	3.8067225	6441	3.8089533	6474	3.8111727
6409	3.8067903	6442	3.8090207	6475	3.8112398
6410	3.8068580	6443	3.8090881	6476	3.8113068
6411	3.8069258	6444	3.8091555	6477	3.8113739
6412	3.8069935	6445	3.8092229	6478	3.8114409
6413	3.8070612	6446	3.8092903	6479	3.8115080
6414	3.8071290	6447	3.8093577	6480	3.8115750
6415	3.8071967	6448	3.8094250	6481	3.8116420
6416	3.8072644	6449	3.8094924	6482	3.8117090
6417	3.8073320	6450	3.8095597	6483	3.8117760
6418	3.8073997	6451	3.8096270	6484	3.8118430
6419	3.8074674	6452	3.8096944	6485	3.8119100
6420	3.8075350	6453	3.8097617	6486	3.8119769
6421	3.8076027	6454	3.8098290	6487	3.8120439
6422	3.8076703	6455	3.8098962	6488	3.8121108
6423	3.8077379	6456	3.8099635	6489	3.8121778
6424	3.8078055	6457	3.8100308	6490	3.8122447
6425	3.8078731	6458	3.8100980	6491	3.8123116
6426	3.8079407	6459	3.8101653	6492	3.8123785
6427	3.8080083	6460	3.8102325	6493	3.8124454
6428	3.8080759	6461	3.8102997	6494	3.8125123
6429	3.8081434	6462	3.8103670	6495	3.8125792
6430	3.8082110	6463	3.8104342	6496	3.8126460
6431	3.8082785	6464	3.8105013	6497	3.8127129
6432	3.8083460	6465	3.8105685	6498	3.8127797
6433	3.8084136	6466	3.8106357	6499	3.8128465
6434	3.8084811	6467	3.8107029	6500	3.8129134

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Num	Logarithm	Num	Logarithm	Num	Logarithm
6501	3.8129802	6534	3.8151791	6567	3.8173670
6502	3.8130470	6535	3.8152456	6568	3.8174331
6503	3.8131138	6536	3.8153120	6569	3.8174993
6504	3.8131805	6537	3.8153785	6570	3.8175654
6505	3.8132473	6538	3.8154449	6571	3.8176315
6506	3.8133141	6539	3.8155113	6572	3.8176976
6507	3.8133808	6540	3.8155777	6573	3.8177636
6508	3.8134475	6541	3.8156441	6574	3.8178297
6509	3.8135143	6542	3.8157105	6575	3.8178958
6510	3.8135810	6543	3.8157769	6576	3.8179618
6511	3.8136477	6544	3.8158435	6577	3.8180278
6512	3.8137144	6545	3.8159096	6578	3.8180939
6513	3.8137811	6546	3.8159760	6579	3.8181599
6514	3.8138478	6547	3.8160423	6580	3.8182259
6515	3.8139144	6548	3.8161087	6581	3.8182919
6516	3.8139811	6549	3.8161750	6582	3.8183579
6517	3.8140477	6550	3.8162413	6583	3.8184239
6518	3.8141144	6551	3.8163076	6584	3.8184898
6519	3.8141810	6552	3.8163739	6585	3.8185558
6520	3.8142476	6553	3.8164402	6586	3.8186217
6521	3.8143142	6554	3.8165064	6587	3.8186877
6522	3.8143808	6555	3.8165726	6588	3.8187536
6523	3.8144474	6556	3.8166389	6589	3.8188195
6524	3.8145140	6557	3.8167052	6590	3.8188854
6525	3.8145805	6558	3.8167714	6591	3.8189513
6526	3.8146471	6559	3.8168376	6592	3.8190172
6527	3.8147136	6560	3.8169038	6593	3.8190831
6528	3.8147801	6561	3.8169700	6594	3.8191489
6529	3.8148467	6562	3.8170362	6595	3.8192148
6530	3.8149132	6563	3.8171024	6596	3.8192806
6531	3.8149797	6564	3.8171686	6597	3.8193465
6532	3.8150462	6565	3.8172347	6598	3.8194123
6533	3.8151127	6566	3.8173009	6599	3.8194781
6534	3.8151791	6567	3.8173670	6600	3.8195439

6600

Num	Logarithm	Num	Logarithm	Num	Logarithm
6601	3.8196097	6634	3.8217755	6667	3.8239305
6602	3.8196755	6635	3.8218409	6668	3.8239958
6603	3.8197413	6636	3.8219064	6669	3.8240607
6604	3.8198071	6637	3.8219718	6670	3.8241258
6605	3.8198728	6638	3.8220372	6671	3.8241909
6606	3.8199386	6639	3.8221027	6672	3.8242560
6607	3.8200043	6640	3.8221681	6673	3.8243211
6608	3.8200700	6641	3.8222335	6674	3.8243862
6609	3.8201358	6642	3.8222989	6675	3.8244513
6610	3.8202015	6643	3.8223643	6676	3.8245163
6611	3.8202672	6644	3.8224296	6677	3.8245814
6612	3.8203328	6645	3.8224950	6678	3.8246464
6613	3.8203985	6646	3.8225603	6679	3.8247114
6614	3.8204642	6647	3.8226257	6680	3.8247765
6615	3.8205298	6648	3.8226910	6681	3.8248415
6616	3.8205955	6649	3.8227563	6682	3.8249065
6617	3.8206611	6650	3.8228211	6683	3.8249715
6618	3.8207268	6651	3.8228869	6684	3.8250364
6619	3.8207924	6652	3.8229522	6685	3.8251014
6620	3.8208580	6653	3.8230175	6686	3.8251664
6621	3.8209236	6654	3.8230828	6687	3.8252313
6622	3.8209892	6655	3.8231481	6688	3.8252963
6623	3.8210548	6656	3.8232133	6689	3.8253612
6624	3.8211203	6657	3.8232786	6690	3.8254261
6625	3.8211859	6658	3.8233438	6691	3.8254910
6626	2.8212514	6659	3.8234090	6692	3.8255559
6627	3.8213170	6660	3.8234742	6693	3.8256208
6628	3.8213825	6661	3.8235394	6694	3.8256857
6629	3.8214480	6662	3.8236046	6695	3.8257506
6630	3.8215135	6663	3.8236698	6696	3.8258154
6631	3.8215790	6664	3.8237350	6697	3.8258803
6632	3.8216445	6665	3.8238002	6698	3.8259451
6633	3.8217100	6666	3.8238653	6699	3.8260100
6634	3.8217755	6667	3.8239305	6700	3.8260748

6700

Num Logarithm	Num Logarithm	Num Logarithm
6701 3.8261396	6734 3.8282731	6767 3.8303962
6702 3.8262044	6735 3.8283376	6768 3.8304603
6703 3.8262692	6736 3.8284021	6769 3.8305245
6704 3.8263340	6737 3.8284665	6770 3.8305887
6705 3.8263988	6738 3.8285310	6771 3.8306528
6706 3.8264635	6739 3.8285955	6772 3.8307169
6707 3.8265283	6740 3.8286599	6773 3.8307811
6708 3.8265932	6741 3.8287243	6774 3.8308452
6709 3.8266578	6742 3.8287887	6775 3.8309093
6710 3.8267225	6743 3.8288532	6776 3.8309734
6711 3.8267872	6744 3.8289176	6777 3.8310375
6712 3.8268519	6745 3.8289820	6778 3.8311016
6713 3.8269166	6746 3.8290463	6779 3.8311656
6714 3.8269813	6747 3.8291107	6780 3.8312297
6715 3.8270460	6748 3.8291751	6781 3.8312937
6716 3.8271107	6749 3.8292394	6782 3.8313578
6717 3.8271753	6750 3.8293038	6783 3.8314218
6718 3.8272400	6751 3.8293681	6784 3.8314858
6719 3.8273046	6752 3.8294324	6785 3.8315499
6720 3.8273693	6753 3.8294967	6786 3.8316139
6721 3.8274339	6754 3.8295611	6787 3.8316778
6722 3.8274985	6755 3.8296254	6788 3.8317418
6723 3.8275631	6756 3.8296896	6789 3.8318058
6724 3.8276277	6757 3.8297539	6790 3.8318698
6725 3.8276923	6758 3.8298182	6791 3.8319337
6726 3.8277569	6759 3.8298824	6792 3.8319977
6727 3.8278214	6760 3.8299467	6793 3.8320616
6728 3.8278860	6761 3.8300109	6794 3.8321255
6729 3.8279505	6762 3.8300752	6795 3.8321895
6730 3.8280151	6763 3.8301394	6796 3.8322534
6731 3.8280795	6764 3.8302036	6797 3.8323173
6732 3.8281441	6765 3.8302678	6798 3.8323812
6733 3.8282086	6766 3.8303320	6799 3.8324450
6734 3.8282731	6767 3.8303962	6800 3.8325089

Num	Logarithm	Num	Logarithm	Num	Logarithm
6801	3.8325728	6834	3.8346750	6867	3.8367670
6802	3.8326366	6835	3.8347385	6868	3.8368303
6803	3.8327005	6836	3.8348021	6869	3.8368935
6804	3.8327643	6837	3.8348656	6870	3.8369567
6805	3.8328281	6838	3.8349291	6871	3.8370199
6806	3.8328919	6839	3.8349926	6872	3.8370832
6807	3.8329558	6840	3.8350561	6873	3.8371463
6808	3.8330195	6841	3.8351196	6874	3.8372095
6809	3.8330833	6842	3.8351831	6875	3.8372727
6810	3.8331471	6843	3.8352465	6876	3.8373359
6811	3.8332109	6844	3.8353100	6877	3.8373990
6812	3.8332746	6845	3.8353735	6878	3.8374622
6813	3.8333384	6846	3.8354369	6879	3.8375253
6814	3.8334021	6847	3.8355003	6880	3.8375884
6815	3.8334659	6848	3.8355638	6881	3.8376516
6816	3.8335296	6849	3.8356272	6882	3.8377147
6817	3.8335933	6850	3.8356906	6883	3.8377778
6818	3.8336570	6851	3.8357540	6884	3.8378409
6819	3.8337207	6852	3.8358174	6885	3.8379039
6820	3.8337844	6853	3.8358807	6886	3.8379670
6821	3.8338480	6854	3.8359441	6887	3.8380301
6822	3.8339117	6855	3.8360075	6888	3.8380931
6823	3.8339754	6856	3.8360708	6889	3.8381562
6824	3.8340390	6857	3.8361341	6890	3.8382192
6825	3.8341027	6858	3.8361975	6891	3.8382822
6826	3.8341663	6859	3.8362608	6892	3.8383453
6827	3.8342299	6860	3.8363241	6893	3.8384083
6828	3.8342935	6861	3.8363874	6894	3.8384713
6829	3.8343571	6862	3.8364507	6895	3.8385343
6830	3.8344207	6863	3.8365140	6896	3.8385973
6831	3.8344843	6864	3.8365773	6897	3.8386602
6832	3.8345479	6865	3.8366405	6898	3.8387232
6833	3.8346114	6866	3.8367038	6899	3.8387861
6834	3.8346750	6867	3.8367670	6900	3.8388491

6900

Num	Logarithm	Num	Logarithm	Num	Logarithm
6901	3.8389120	6934	3.8409838	6967	3.8430458
6902	3.8389750	6935	3.8410465	6968	3.8431081
6903	3.8390379	6936	3.8411091	6969	3.8431705
6904	3.8391008	6937	3.8411717	6970	3.8432328
6905	3.8391637	6938	3.8412343	6971	3.8432951
6906	3.8392266	6939	3.8412969	6972	3.8433574
6907	3.8392895	6940	3.8413595	6973	3.8434197
6908	3.8393523	6941	3.8414220	6974	3.8434819
6909	3.8394152	6942	3.8414846	6975	3.8435442
6910	3.8394780	6943	3.8415472	6976	3.8436065
6911	3.8395409	6944	3.8416097	6977	3.8436687
6912	3.8396037	6945	3.8416722	6978	3.8437310
6913	3.8396666	6946	3.8417348	6979	3.8437932
6914	3.8397294	6947	3.8417973	6980	3.8438554
6915	3.8397922	6948	3.8418598	6981	3.8439176
6916	3.8398550	6949	3.8419223	6982	3.8439798
6917	3.8399178	6950	3.8419848	6983	3.8440420
6918	3.8399806	6951	3.8420473	6984	3.8441042
6919	3.8400433	6952	3.8421098	6985	3.8441664
6920	3.8401061	6953	3.8421722	6986	3.8442286
6921	3.8401688	6954	3.8422347	6987	3.8442907
6922	3.8402316	6955	3.8422971	6988	3.8443529
6923	3.8402943	6956	3.8423596	6989	3.8444150
6924	3.8403571	6957	3.8424220	6990	3.8444772
6925	3.8404198	6958	3.8424844	6991	3.8445393
6926	3.8404825	6959	3.8425468	6992	3.8446014
6927	3.8405452	6960	3.8426092	6993	3.8446635
6928	3.8406079	6961	3.8426716	6994	3.8447256
6929	3.8406706	6962	3.8427340	6995	3.8447877
6930	3.8407332	6963	3.8427964	6996	3.8448498
6931	3.8407959	6964	3.8428588	6997	3.8449119
6932	3.8408586	6965	3.8429211	6998	3.8449739
6933	3.8409212	6966	3.8429835	6999	3.8450360
6934	3.8409838	6967	3.8430458	7000	3.8450980

7000

7000

Num	Logarithm	Num	Logarithm	Num	Logarithm
7001	3.8451601	7034	3.8472024	7067	3.8492351
7002	3.8452221	7035	3.8472641	7068	3.8492965
7003	3.8452841	7036	3.8473258	7069	3.8493580
7004	3.8453461	7037	3.8473876	7070	3.8494194
7005	3.8454081	7038	3.8474493	7071	3.8494808
7006	3.8454701	7039	3.8475110	7072	3.8495423
7007	3.8455321	7040	3.8475727	7073	3.8496037
7008	3.8455941	7041	3.8476343	7074	3.8496651
7009	3.8456561	7042	3.8476960	7075	3.8497264
7010	3.8457180	7043	3.8477577	7076	3.8497878
7011	3.8457800	7044	3.8478193	7077	3.8498492
7012	3.8458419	7045	3.8478810	7078	3.8499106
7013	3.8459038	7046	3.8479426	7079	3.8499719
7014	3.8459658	7047	3.8480043	7080	3.8500333
7015	3.8460277	7048	3.8480659	7081	3.8500946
7016	3.8460896	7049	3.8481275	7082	3.8501555
7017	3.8461515	7050	3.8481891	7083	3.8502172
7018	3.8462134	7051	3.8482507	7084	3.8502786
7019	3.8462752	7052	3.8483123	7085	3.8503399
7020	3.8463371	7053	3.8483739	7086	3.8504011
7021	3.8463990	7054	3.8484355	7087	3.8504624
7022	3.8464608	7055	3.8484970	7088	3.8505237
7023	3.8465227	7056	3.8485586	7089	3.8505850
7024	3.8465845	7057	3.8486201	7090	3.8506462
7025	3.8466463	7058	3.8486817	7091	3.8507075
7026	3.8467081	7059	3.8487432	7092	3.8507687
7027	3.8467700	7060	3.8488047	7093	3.8508300
7028	3.8468318	7061	3.8488662	7094	3.8508912
7029	3.8468935	7062	3.8489277	7095	3.8509524
7030	3.8469553	7063	3.8489892	7096	3.8510136
7031	3.8470171	7064	3.8490507	7097	3.8510748
7032	3.8470789	7065	3.8491122	7098	3.8511360
7033	3.8471406	7066	3.8491735	7099	3.8511972
7034	3.8472024	7067	3.8492351	7100	3.8512580

7100

Num	Logarithm	Num	Logarithm	Num	Logarithm
7101	3.8513195	7134	3.8533331	7167	3.8553374
7102	3.8513807	7135	3.8533940	7168	3.8553980
7103	3.8514418	7136	3.8534548	7169	3.8554586
7104	3.8515030	7137	3.8535157	7170	3.8555192
7105	3.8515641	7138	3.8535765	7171	3.8555797
7106	3.8516252	7139	3.8536374	7172	3.8556403
7107	3.8516863	7140	3.8536982	7173	3.8557008
7108	3.8517474	7141	3.8537590	7174	3.8557614
7109	3.8518085	7142	3.8538198	7175	3.8558219
7110	3.8518696	7143	3.8538806	7176	3.8558824
7111	3.8519307	7144	3.8539414	7177	3.8559429
7112	3.8519917	7145	3.8540022	7178	3.8560035
7113	3.8520528	7146	3.8540630	7179	3.8560640
7114	3.8521139	7147	3.8541238	7180	3.8561244
7115	3.8521749	7148	3.8541845	7181	3.8561849
7116	3.8522359	7149	3.8542453	7182	3.8562454
7117	3.8522970	7150	3.8543060	7183	3.8563059
7118	3.8523580	7151	3.8543668	7184	3.8563663
7119	3.8524190	7152	3.8544275	7185	3.8564268
7120	3.8524800	7153	3.8544882	7186	3.8564872
7121	3.8525410	7154	3.8545489	7187	3.8565476
7122	3.8526020	7155	3.8546096	7188	3.8566081
7123	3.8526629	7156	3.8546703	7189	3.8566685
7124	3.8527239	7157	3.8547310	7190	3.8567289
7125	3.8527849	7158	3.8547917	7191	3.8567893
7126	3.8528458	7159	3.8548524	7192	3.8568497
7127	3.8529068	7160	3.8549130	7193	3.8569101
7128	3.8529677	7161	3.8549737	7194	3.8569704
7129	3.8530286	7162	3.8550343	7195	3.8570308
7130	3.8530895	7163	3.8550949	7196	3.8570912
7131	3.8531506	7164	3.8551556	7197	3.8571515
7132	3.8532113	7165	3.8552162	7198	3.8572118
7133	3.8532722	7166	3.8552768	7199	3.8572722
7134	3.8533331	7167	3.8553374	7200	3.8573325

Num	Logarithm	Num	Logarithm	Num	Logarithm
7201	3.8573928	7234	3.8593785	7267	3.8613552
7202	3.8574531	7235	3.8594385	7268	3.8614149
7203	3.8575134	7236	3.8594986	7269	3.8614747
7204	3.8575737	7237	3.8595586	7270	3.8615344
7205	3.8576340	7238	3.8596186	7271	3.8615941
7206	3.8576943	7239	3.8596786	7272	3.8616539
7207	3.8577545	7240	3.8597386	7273	3.8617136
7208	3.8578148	7241	3.8597985	7274	3.8617733
7209	3.8578750	7242	3.8598585	7275	3.8618330
7210	3.8579353	7243	3.8599185	7276	3.8618927
7211	3.8579955	7244	3.8599784	7277	3.8619524
7212	3.8580557	7245	3.8600384	7278	3.8620120
7213	3.8581159	7246	3.8600983	7279	3.8620717
7214	3.8581761	7247	3.8601583	7280	3.8621314
7215	3.8582363	7248	3.8602182	7281	3.8621910
7216	3.8582965	7249	3.8602781	7282	3.8622507
7217	3.8583567	7250	3.8603380	7283	3.8623103
7218	3.8584169	7251	3.8603979	7284	3.8623699
7219	3.8584770	7252	3.8604578	7285	3.8624296
7220	3.8585372	7253	3.8605177	7286	3.8624892
7221	3.8585973	7254	3.8605776	7287	3.8625488
7222	3.8586575	7255	3.8606374	7288	3.8626084
7223	3.8587176	7256	3.8606973	7289	3.8626679
7224	3.8587777	7257	3.8607571	7290	3.8627275
7225	3.8588379	7258	3.8608170	7291	3.8627871
7226	3.8588980	7259	3.8608768	7292	3.8628467
7227	3.8589581	7260	3.8609366	7293	3.8629062
7228	3.8590181	7261	3.8609964	7294	3.8629658
7229	3.8590782	7262	3.8610562	7295	3.8630253
7230	3.8591383	7263	3.8611160	7296	3.8630848
7231	3.8591984	7264	3.8611758	7297	3.8631443
7232	3.8592584	7265	3.8612356	7298	3.8632039
7233	3.8593185	7266	3.8612954	7299	3.8632634
7234	3.8593785	7267	3.8613552	7300	3.8633229

Num	Logarithm	Num	Logarithm	Num	Logarithm
7301	3.8633823	7334	3.8653409	7367	3.8672907
7302	3.8634418	7335	3.8654001	7368	3.8673496
7303	3.8635013	7336	3.8654593	7369	3.8674086
7304	3.8635608	7337	3.8655185	7370	3.8674675
7305	3.8636202	7338	3.8655777	7371	3.8675264
7306	3.8636797	7339	3.8656369	7372	3.8675853
7307	3.8637391	7340	3.8656961	7373	3.8676442
7308	3.8637985	7341	3.8657552	7374	3.8677031
7309	3.8638580	7342	3.8658144	7375	3.8677620
7310	3.8639174	7343	3.8658735	7376	3.8678209
7311	3.8639768	7344	3.8659327	7377	3.8678798
7312	3.8640362	7345	3.8659918	7378	3.8679387
7313	3.8640956	7346	3.8660509	7379	3.8679975
7314	3.8641550	7347	3.8661100	7380	3.8680564
7315	3.8642143	7348	3.8661691	7381	3.8681152
7316	3.8642737	7349	3.8662282	7382	3.8681740
7317	3.8643331	7350	3.8662873	7383	3.8682329
7318	3.8643924	7351	3.8663464	7384	3.8682917
7319	3.8644517	7352	3.8664055	7385	3.8683505
7320	3.8645111	7353	3.8664646	7386	3.8684093
7321	3.8645704	7354	3.8665236	7387	3.8684681
7322	3.8646297	7355	3.8665827	7388	3.8685269
7323	3.8646890	7356	3.8666417	7389	3.8685857
7324	3.8647483	7357	3.8667008	7390	3.8686444
7325	3.8648076	7358	3.8667598	7391	3.8687032
7326	3.8648669	7359	3.8668188	7392	3.8687620
7327	3.8649262	7360	3.8668778	7393	3.8688207
7328	3.8649855	7361	3.8669368	7394	3.8688794
7329	3.8650447	7362	3.8669958	7395	3.8689382
7330	3.8651040	7363	3.8670548	7396	3.8689969
7331	3.8651632	7364	3.8671138	7397	3.8690556
7332	3.8652225	7365	3.8671728	7398	3.8691143
7333	3.8652817	7366	3.8672317	7399	3.8691730
7334	3.8653409	7367	3.8672907	7400	3.8692317

7400

Num	Logarithm	Num	Logarithm	Num	Logarithm
7401	3.8692904	7434	3.8712226	7467	3.8731461
7402	3.8693491	7435	3.8712810	7468	3.8732043
7403	3.8694077	7436	3.8713394	7469	3.8732625
7404	3.8694664	7437	3.8713978	7470	3.8733206
7405	3.8695251	7438	3.8714562	7471	3.8733787
7406	3.8695837	7439	3.8715146	7472	3.8734369
7407	3.8696423	7440	3.8715729	7473	3.8734950
7408	3.8697010	7441	3.8716313	7474	3.8735531
7409	3.8697596	7442	3.8716897	7475	3.8736112
7410	3.8698182	7443	3.8717480	7476	3.8736693
7411	3.8698768	7444	3.8718064	7477	3.8737274
7412	3.8699354	7445	3.8718647	7478	3.8737855
7413	3.8699940	7446	3.8719230	7479	3.8738435
7414	3.8700526	7447	3.8719814	7480	3.8739016
7415	3.8701112	7448	3.8720397	7481	3.8739597
7416	3.8701697	7449	3.8720980	7482	3.8740177
7417	3.8702283	7450	3.8721563	7483	3.8740757
7418	3.8702868	7451	3.8722146	7484	3.8741338
7419	3.8703454	7452	3.8722728	7485	3.8741919
7420	3.8704039	7453	3.8723311	7486	3.8742498
7421	3.8704624	7454	3.8723894	7487	3.8743078
7422	3.8705209	7455	3.8724476	7488	3.8743658
7423	3.8705795	7456	3.8725059	7489	3.8744238
7424	3.8706380	7457	3.8725641	7490	3.8744818
7425	3.8706965	7458	3.8726224	7491	3.8745398
7426	3.8707549	7459	3.8726806	7492	3.8745978
7427	3.8708134	7460	3.8727388	7493	3.8746557
7428	3.8708719	7461	3.8727970	7494	3.8747137
7429	3.8709304	7462	3.8728552	7495	3.8747716
7430	3.8709888	7463	3.8729134	7496	3.8748296
7431	3.8710473	7464	3.8729716	7497	3.8748875
7432	3.8711057	7465	3.8730298	7498	3.8749454
7433	3.8711641	7466	3.8730880	7499	3.8750034
7434	3.8712226	7467	3.8731461	7500	3.8750613

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7500

Num	Logarithm	Num	Logarithm	Num	Logarithm
7501	3.8751192	7534	3.8770256	7567	3.8789237
7502	3.8751771	7535	3.8770833	7568	3.8789811
7503	3.8752349	7536	3.8771409	7569	3.8790385
7504	3.8752928	7537	3.8771985	7570	3.8790959
7505	3.8753507	7538	3.8772561	7571	3.8791532
7506	3.8754086	7539	3.8773137	7572	3.8792106
7507	3.8754664	7540	3.8773713	7573	3.8792680
7508	3.8755243	7541	3.8774289	7574	3.8793253
7509	3.8755821	7542	3.8774865	7575	3.8793826
7510	3.8756399	7543	3.8775441	7576	3.8794400
7511	3.8756978	7544	3.8776017	7577	3.8794973
7512	3.8757556	7545	3.8776592	7578	3.8795546
7513	3.8758134	7546	3.8777168	7579	3.8796119
7514	3.8758712	7547	3.8777743	7580	3.8796692
7515	3.8759290	7548	3.8778319	7581	3.8797265
7516	3.8759868	7549	3.8778894	7582	3.8797838
7517	3.8760445	7550	3.8779469	7583	3.8798411
7518	3.8761023	7551	3.8780045	7584	3.8798983
7519	3.8761601	7552	3.8780620	7585	3.8799556
7520	3.8762178	7553	3.8781195	7586	3.8800128
7521	3.8762756	7554	3.8781770	7587	3.8800701
7522	3.8763333	7555	3.8782345	7588	3.8801273
7523	3.8763911	7556	3.8782919	7589	3.8801846
7524	3.8764488	7557	3.8783494	7590	3.8802418
7525	3.8765065	7558	3.8784069	7591	3.8802990
7526	3.8765642	7559	3.8784643	7592	3.8803562
7527	3.8766219	7560	3.8785218	7593	3.8804134
7528	3.8766795	7561	3.8785792	7594	3.8804706
7529	3.8767373	7562	3.8786367	7595	3.8805278
7530	3.8767950	7563	3.8786941	7596	3.8805850
7531	3.8768526	7564	3.8787515	7597	3.8806421
7532	3.8769103	7565	3.8788089	7598	3.8806993
7533	3.8769680	7566	3.8788663	7599	3.8807564
7534	3.8770256	7567	3.8789237	7600	3.8808136

7600

Num	Logarithm	Num	Logarithm	Num	Logarithm
7601	3.8808707	7634	3.8827522	7667	3.8846255
7602	3.8809279	7635	3.8828090	7668	3.8846821
7603	3.8809850	7636	3.8828659	7669	3.8847387
7604	3.8810421	7637	3.8829228	7670	3.8847954
7605	3.8810992	7638	3.8829797	7671	3.8848520
7606	3.8811563	7639	3.8830365	7672	3.8849086
7607	3.8812134	7640	3.8830934	7673	3.8849652
7608	3.8812705	7641	3.8831502	7674	3.8850218
7609	3.8813276	7642	3.8832070	7675	3.8850784
7610	3.8813847	7643	3.8832639	7676	3.8851350
7611	3.8814417	7644	3.8833207	7677	3.8851915
7612	3.8814988	7645	3.8833775	7678	3.8852481
7613	3.8815558	7646	3.8834343	7679	3.8853047
7614	3.8816129	7647	3.8834911	7680	3.8853612
7615	3.8816699	7648	3.8835479	7681	3.8854178
7616	3.8817269	7649	3.8836047	7682	3.8854743
7617	3.8817840	7650	3.8836614	7683	3.8855308
7618	3.8818410	7651	3.8837182	7684	3.8855874
7619	3.8818980	7652	3.8837750	7685	3.8856439
7620	3.8819550	7653	3.8838317	7686	3.8857004
7621	3.8820120	7654	3.8838885	7687	3.8857569
7622	3.8820689	7655	3.8839452	7688	3.8858134
7623	3.8821259	7656	3.8840019	7689	3.8858699
7624	3.8821829	7657	3.8840585	7690	3.8859263
7625	3.8822398	7658	3.8841154	7691	3.8859828
7626	3.8822958	7659	3.8841721	7692	3.8860393
7627	3.8823537	7660	3.8842288	7693	3.8860957
7628	3.8824107	7661	3.8842855	7694	3.8861522
7629	3.8824676	7662	3.8843421	7695	3.8862086
7630	3.8825245	7663	3.8843988	7696	3.8862651
7631	3.8825815	7664	3.8844555	7697	3.8863215
7632	3.8826384	7665	3.8845122	7698	3.8863779
7633	3.8826953	7666	3.8845688	7699	3.8864343
7634	3.8827522	7667	3.8846255	7700	3.8864907

7700

Num	Logarithm	Num	Logarithm	Num	Logarithm
7701	3.8865471	7734	3.8884042	7767	3.8902533
7702	3.8866035	7735	3.8884603	7768	3.8903092
7703	3.8866599	7736	3.8885165	7769	3.8903651
7704	3.8867163	7737	3.8885726	7770	3.8904210
7705	3.8867726	7738	3.8886287	7771	3.8904769
7706	3.8868290	7739	3.8886848	7772	3.8905328
7707	3.8868854	7740	3.8887410	7773	3.8905887
7708	3.8869417	7741	3.8887971	7774	3.8906445
7709	3.8869980	7742	3.8888532	7775	3.8907004
7710	3.8870544	7743	3.8889093	7776	3.8907563
7711	3.8871107	7744	3.8889653	7777	3.8908121
7712	3.8871670	7745	3.8890214	7778	3.8908679
7713	3.8872233	7746	3.8890775	7779	3.8909238
7714	3.8872796	7747	3.8891336	7780	3.8909796
7715	3.8873359	7748	3.8891896	7781	3.8910354
7716	3.8873922	7749	3.8892457	7782	3.8910912
7717	3.8874485	7750	3.8893017	7783	3.8911470
7718	3.8875048	7751	3.8893577	7784	3.8912028
7719	3.8875610	7752	3.8894138	7785	3.8912586
7720	3.8876173	7753	3.8894698	7786	3.8913144
7721	3.8876736	7754	3.8895258	7787	3.8913702
7722	3.8877298	7755	3.8895818	7788	3.8914259
7723	3.8877860	7756	3.8896378	7789	3.8914817
7724	3.8878423	7757	3.8896938	7790	3.8915375
7725	3.8878985	7758	3.8897498	7791	3.8915932
7726	3.8879547	7759	3.8898058	7792	3.8916489
7727	3.8880109	7760	3.8898617	7793	3.8917047
7728	3.8880671	7761	3.8899177	7794	3.8917604
7729	3.8881233	7762	3.8899736	7795	3.8918161
7730	3.8881795	7763	3.8900296	7796	3.8918718
7731	3.8882357	7764	3.8900855	7797	3.8919275
7732	3.8882918	7765	3.8901415	7798	3.8919832
7733	3.8883480	7766	3.8901974	7799	3.8920389
7734	3.8884042	7767	3.8902533	7800	3.8920946

7800

Num	Logarithm	Num	Logarithm	Num	Logarithm
7801	3.8921503	7834	3.8939836	7867	3.8958091
7802	3.8922059	7835	3.8940390	7868	3.8958643
7803	3.8922616	7836	3.8940944	7869	3.8959195
7804	3.8923173	7837	3.8941498	7870	3.8959747
7805	3.8923729	7838	3.8942053	7871	3.8960299
7806	3.8924285	7839	3.8942607	7872	3.8960851
7807	3.8924842	7840	3.8943161	7873	3.8961403
7808	3.8925398	7841	3.8943715	7874	3.8961954
7809	3.8925954	7842	3.8944268	7875	3.8962506
7810	3.8926510	7843	3.8944822	7876	3.8963057
7811	3.8927066	7844	3.8945376	7877	3.8963608
7812	3.8927622	7845	3.8945929	7878	3.8964160
7813	3.8928178	7846	3.8946483	7879	3.8964711
7814	3.8928734	7847	3.8947037	7880	3.8965262
7815	3.8929290	7848	3.8947590	7881	3.8965813
7816	3.8929846	7849	3.8948143	7882	3.8966364
7817	3.8930401	7850	3.8948697	7883	3.8966915
7818	3.8930957	7851	3.8949250	7884	3.8967466
7819	3.8931512	7852	3.8949803	7885	3.8968017
7820	3.8932068	7853	3.8950356	7886	3.8968568
7821	3.8932623	7854	3.8950909	7887	3.8969118
7822	3.8933178	7855	3.8951462	7888	3.8969669
7823	3.8933733	7856	3.8952015	7889	3.8970220
7824	3.8934288	7857	3.8952568	7890	3.8970770
7825	3.8934843	7858	3.8953120	7891	3.8971320
7826	3.8935398	7859	3.8953673	7892	3.8971871
7827	3.8935953	7860	3.8954225	7893	3.8972421
7828	3.8936508	7861	3.8954778	7894	3.8972971
7829	3.8937063	7862	3.8955330	7895	3.8973521
7830	3.8937618	7863	3.8955883	7896	3.8974071
7831	3.8938172	7864	3.8956435	7897	3.8974621
7832	3.8938727	7865	3.8956987	7898	3.8975171
7833	3.8939281	7866	3.8957539	7899	3.8975721
7834	3.8939836	7867	3.8958091	7900	3.8976271

7900

Num	Logarithm	Num	Logarithm	Num	Logarithm
7901	3.8976821	7934	3.8994922	7967	3.9012948
7902	3.89777370	7935	3.8995469	7968	3.9013493
7903	3.8977920	7936	3.8996017	7969	3.9014038
7904	3.8978469	7937	3.8996564	7970	3.9014583
7905	3.8979019	7938	3.8997111	7971	3.9015128
7906	3.8979568	7939	3.8997658	7972	3.9015673
7907	3.8980117	7940	3.8998205	7973	3.9016218
7908	3.8980667	7941	3.8998752	7974	3.9016762
7909	3.8981216	7942	3.8999299	7975	3.9017307
7910	3.8981765	7943	3.8999846	7976	3.9017851
7911	3.8982314	7944	3.9000392	7977	3.9018396
7912	3.8982863	7945	3.9000939	7978	3.9018940
7913	3.8983412	7946	3.9001486	7979	3.9019485
7914	3.8983960	7947	3.9002032	7980	3.9020029
7915	3.8984509	7948	3.9002579	7981	3.9020573
7916	3.8985058	7949	3.9003125	7982	3.9021117
7917	3.8985606	7950	3.9003671	7983	3.9021661
7918	3.8986155	7951	3.9004218	7984	3.9022205
7919	3.8986703	7952	3.9004764	7985	3.9022749
7920	3.8987252	7953	3.9005310	7986	3.9023293
7921	2.8987800	7954	3.9005856	7987	3.9023837
7922	3.8988348	7955	3.9006402	7988	3.9024381
7923	3.8988897	7956	3.9006948	7989	3.9024924
7924	3.8989445	7957	3.9007494	7990	3.9025468
7925	3.8989993	7958	3.9008039	7991	3.9026011
7926	3.8990541	7959	3.9008585	7992	3.9026555
7927	3.8991089	7960	3.9009131	7993	3.9027098
7928	3.8991636	7961	3.9009676	7994	3.9027641
7929	3.8992184	7962	3.9010222	7995	3.9028185
7930	3.8992732	7963	3.9010767	7996	3.9028728
7931	3.8993279	7964	3.9011313	7997	3.9029271
7932	3.8993827	7965	3.9011858	7998	3.9029814
7933	3.8994375	7966	3.9012403	7999	3.9030357
7934	3.8994922	7967	3.9012948	8000	3.9030900

Num	Logarithm	Num	Logarithm	Num	Logarithm
8001	3.9031443	8034	3.9049318	8067	3.9067121
8002	3.9031985	8035	3.9049859	8068	3.9067659
8003	3.9032528	8036	3.9050399	8069	3.9068197
8004	3.9033071	8037	3.9050940	8070	3.9068735
8005	3.9033613	8038	3.9051480	8071	3.9069273
8006	3.9034156	8039	3.9052020	8072	3.9069812
8007	3.9034698	8040	3.9052560	8073	3.9070350
8008	3.9035241	8041	3.9053101	8074	3.9070887
8009	3.9035783	8042	3.9053641	8075	3.9071425
8010	3.9036325	8043	3.9054181	8076	3.9071963
8011	3.9036867	8044	3.9054721	8077	3.9072501
8012	3.9037409	8045	3.9055260	8078	3.9073038
8013	3.9037951	8046	3.9055800	8079	3.9073576
8014	3.9038493	8047	3.9056340	8080	3.9074114
8015	3.9039035	8048	3.9056880	8081	3.9074651
8016	3.9039577	8049	3.9057419	8082	3.9075188
8017	3.9040119	8050	3.9057959	8083	3.9075726
8018	3.9040661	8051	3.9058498	8084	3.9076263
8019	3.9041202	8052	3.9059038	8085	3.9076800
8020	3.9041744	8053	3.9059577	8086	3.9077337
8021	3.9042285	8054	3.9060116	8087	3.9077874
8022	3.9042827	8055	3.9060655	8088	3.9078411
8023	3.9043368	8056	3.9061195	8089	3.9078948
8024	3.9043909	8057	3.9061734	8090	3.9079485
8025	3.9044450	8058	3.9062273	8091	3.9080022
8026	3.9044992	8059	3.9062812	8092	3.9080559
8027	3.9045533	8060	3.9063350	8093	3.9081095
8028	3.9046074	8061	3.9063889	8094	3.9081632
8029	3.9046615	8062	3.9064428	8095	3.9082169
8030	3.9047155	8063	3.9064967	8096	3.9082705
8031	3.9047696	8064	3.9065505	8097	3.9083241
8032	3.9048237	8065	3.9066044	8098	3.9083778
8033	3.9048778	8066	3.9066582	8099	3.9084314
8034	3.9049318	8067	3.9067121	8100	3.9084850

Num	Logarithm	Num	Logarithm	Num	Logarithm
8101	3.9085386	8134	3.9103042	8167	3.9120626
8102	3.9085922	8135	3.9103576	8168	3.9121157
8103	3.9086458	8136	3.9104109	8169	3.9121685
8104	3.9086994	8137	3.9104643	8170	3.9122221
8105	3.9087530	8138	3.9105177	8171	3.9122752
8106	3.9088066	8139	3.9105710	8172	3.9123284
8107	3.9088602	8140	3.9106244	8173	3.9123815
8108	3.9089137	8141	3.9106778	8174	3.9124346
8109	3.9089673	8142	3.9107311	8175	3.9124878
8110	3.9090209	8143	3.9107844	8176	3.9125409
8111	3.9090744	8144	3.9108378	8177	3.9125940
8112	3.9091279	8145	3.9108911	8178	3.9126471
8113	3.9091815	8146	3.9109444	8179	3.9127002
8114	3.9092350	8147	3.9109977	8180	3.9127533
8115	3.9092885	8148	3.9110510	8181	3.9128064
8116	3.9093420	8149	3.9111043	8182	3.9128595
8117	3.9093955	8150	3.9111576	8183	3.9129126
8118	3.9094490	8151	3.9112109	8184	3.9129656
8119	3.9095025	8152	3.9112642	8185	3.9130187
8120	3.9095560	8153	3.9113174	8186	3.9130717
8121	3.9096095	8154	3.9113707	8187	3.9131248
8122	3.9096630	8155	3.9114240	8188	3.9131778
8123	3.9097165	8156	3.9114772	8189	3.9132309
8124	3.9097699	8157	3.9115305	8190	3.9132839
8125	3.9098234	8158	3.9115837	8191	3.9133369
8126	3.9098768	8159	3.9116369	8192	3.9133899
8127	3.9099303	8160	3.9116902	8193	3.9134430
8128	3.9099837	8161	3.9117434	8194	3.9134960
8129	3.9100371	8162	3.9117966	8195	3.9135490
8130	3.9100905	8163	3.9118498	8196	3.9136019
8131	3.9101440	8164	3.9119030	8197	3.9136549
8132	3.9101974	8165	3.9119562	8198	3.9137079
8133	3.9102508	8166	3.9120094	8199	3.9137609
8134	3.9103042	8167	3.9120626	8200	3.9138139

Num	Logarithm	Num	Logarithm	Num	Logarithm
8201	3.9138668	8234	3.9156109	8267	3.9173479
8202	3.9139198	8235	3.9156636	8268	3.9174005
8203	3.9139727	8236	3.9157163	8269	3.9174530
8204	3.9140257	8237	3.9157691	8270	3.9175055
8205	3.9140786	8238	3.9158218	8271	3.9175580
8206	3.9141315	8239	3.9158745	8272	3.9176105
8207	3.9141844	8240	3.9159272	8273	3.9176630
8208	3.9142373	8241	3.9159799	8274	3.9177155
8209	3.9142903	8242	3.9160326	8275	3.9177680
8210	3.9143432	8243	3.9160853	8276	3.9178205
8211	3.9143961	8244	3.9161380	8277	3.9178730
8212	3.9144489	8245	3.9161907	8278	3.9179254
8213	3.9145018	8246	3.9162433	8279	3.9179779
8214	3.9145547	8247	3.9162960	8280	3.9180303
8215	3.9146076	8248	3.9163487	8281	3.9180828
8216	3.9146604	8249	3.9164013	8282	3.9181352
8217	3.9147133	8250	3.9164539	8283	3.9181877
8218	3.9147661	8251	3.9165066	8284	3.9182401
8219	3.9148190	8252	3.9165592	8285	3.9182925
8220	3.9148718	8253	3.9166118	8286	3.9183449
8221	3.9149246	8254	3.9166645	8287	3.9183973
8222	3.9149775	8255	3.9167171	8288	3.9184497
8223	3.9150303	8256	3.9167697	8289	3.9185021
8224	3.9150831	8257	3.9168223	8290	3.9185545
8225	3.9151359	8258	3.9168749	8291	3.9186069
8226	3.9151887	8259	3.9169275	8292	3.9186593
8227	3.9152415	8260	3.9169800	8293	3.9187117
8228	3.9152943	8261	3.9170326	8294	3.9187640
8229	3.9153471	8262	3.9170852	8295	3.9188164
8230	3.9153998	8263	3.9171378	8296	3.9188687
8231	3.9154526	8264	3.9171903	8297	3.9189211
8232	3.9155054	8265	3.9172429	8298	3.9189734
8233	3.9155581	8266	3.9172954	8299	3.9190258
8234	3.9156109	8267	3.9173479	8300	3.9190781

Num	Logarithm	Num	Logarithm	Num	Logarithm
8301	3.9191304	8334	3.9208535	8367	3.9225698
8302	3.9191827	8335	3.9209056	8368	3.9226217
8303	3.9192350	8336	3.9209577	8369	3.9226736
8304	3.9192873	8337	3.9210098	8370	3.9227255
8305	3.9193396	8338	3.9210619	8371	3.9227773
8306	3.9193919	8339	3.9211140	8372	3.9228292
8307	3.9194442	8340	3.9211661	8373	3.9228811
8308	3.9194965	8341	3.9212181	8374	3.9229330
8309	3.9195488	8342	3.9212702	8375	3.9229848
8310	3.9196010	8343	3.9213222	8376	3.9230367
8311	3.9196533	8344	3.9213743	8377	3.9230885
8312	3.9197055	8345	3.9214263	8378	3.9231404
8313	3.9197578	8346	3.9214784	8379	3.9231922
8314	3.9198100	8347	3.9215304	8380	3.9232441
8315	3.9198623	8348	3.9215824	8381	3.9232958
8316	3.9199145	8349	3.9216345	8382	3.9233477
8317	3.9199667	8350	3.9216865	8383	3.9233995
8318	3.9200189	8351	3.9217385	8384	3.9234513
8319	3.9200711	8352	3.9217905	8385	3.9235031
8320	3.9201233	8353	3.9218425	8386	3.9235549
8321	3.9201755	8354	3.9218945	8387	3.9236066
8322	3.9202277	8355	3.9219465	8388	3.9236584
8323	3.9202799	8356	3.9219984	8389	3.9237102
8324	3.9203321	8357	3.9220504	8390	3.9237620
8325	3.9203842	8358	3.9221024	8391	3.9238137
8326	3.9204364	8359	3.9221543	8392	3.9238655
8327	3.9204886	8360	3.9222063	8393	3.9239172
8328	3.9205407	8361	3.9222582	8394	3.9239690
8329	3.9205929	8362	3.9223102	8395	3.9240207
8330	3.9206450	8363	3.9223621	8396	3.9240724
8331	3.9206971	8364	3.9224140	8397	3.9241242
8332	3.9207493	8365	3.9224659	8398	3.9241779
8333	3.9208014	8366	3.9225179	8399	3.9242276
8334	3.9208535	8367	3.9225698	8400	3.9242793

Num	Logarithm	Num	Logarithm	Num	Logarithm
8401	3.9243310	8434	3.9260336	8467	3.9277296
8402	3.9243827	8435	3.9260851	8468	3.9277808
8403	3.9244344	8436	3.9261366	8469	3.9278321
8404	3.9244860	8437	3.9261880	8470	3.9278834
8405	3.9245377	8438	3.9262395	8471	3.9279347
8406	3.9245894	8439	3.9262910	8472	3.9279859
8407	3.9246410	8440	3.9263424	8473	3.9280372
8408	3.9246927	8441	3.9263939	8474	3.9280885
8409	3.9247444	8442	3.9264453	8475	3.9281397
8410	3.9247960	8443	3.9264968	8476	3.9281909
8411	3.9248476	8444	3.9265482	8477	3.9282422
8412	3.9248993	8445	3.9265997	8478	3.9282934
8413	3.9249509	8446	3.9266511	8479	3.9283446
8414	3.9250025	8447	3.9267025	8480	3.9283959
8415	3.9250541	8448	3.9267539	8481	3.9284471
8416	3.9251057	8449	3.9268053	8482	3.9284983
8417	3.9251573	8450	3.9268567	8483	3.9285495
8418	3.9252089	8451	3.9269081	8484	3.9286007
8419	3.9252605	8452	3.9269595	8485	3.9286518
8420	3.9253121	8453	3.9270109	8486	3.9287030
8421	3.9253637	8454	3.9270622	8487	3.9287542
8422	3.9254152	8455	3.9271136	8488	3.9288054
8423	3.9254668	8456	3.9271650	8489	3.9288565
8424	3.9255184	8457	3.9272163	8490	3.9289077
8425	3.9255699	8458	3.9272677	8491	3.9289588
8426	3.9256215	8459	3.9273191	8492	3.9290100
8427	3.9256730	8460	3.9273704	8493	3.9290611
8428	3.9257245	8461	3.9274217	8494	3.9291123
8429	3.9257761	8462	3.9274730	8495	3.9291634
8430	3.9258276	8463	3.9275243	8496	3.9292145
8431	3.9258791	8464	3.9275757	8497	3.9292656
8432	3.9259306	8465	3.9276270	8498	3.9293167
8433	3.9259821	8466	3.9276783	8499	3.9293678
8434	3.9260336	8467	3.9277296	8500	3.9294189

Num	Logarithm	Num	Logarithm	Num	Logarithm
8501	3.9294700	8534	3.9311526	8567	3.9328288
8502	3.9295211	8535	3.9312035	8568	3.9328795
8503	3.9295722	8536	3.9312544	8569	3.9329301
8504	3.9296233	8537	3.9313053	8570	3.9329808
8505	3.9296743	8538	3.9313561	8571	3.9330315
8506	3.9297254	8539	3.9314070	8572	3.9330822
8507	3.9297764	8540	3.9314579	8573	3.9331328
8508	3.9298275	8541	3.9315087	8574	3.9331835
8509	3.9298785	8542	3.9315596	8575	3.9332341
8510	3.9299296	8543	3.9316104	8576	3.9332848
8511	3.9299806	8544	3.9316612	8577	3.9333354
8512	3.9300316	8545	3.9317121	8578	3.9333860
8513	3.9300826	8546	3.9317629	8579	3.9334367
8514	3.9301336	8547	3.9318137	8580	3.9334873
8515	3.9301847	8548	3.9318645	8581	3.9335379
8516	3.9302357	8549	3.9319153	8582	3.9335885
8517	3.9302866	8550	3.9319661	8583	3.9336391
8518	3.9303376	8551	3.9320169	8584	3.9336897
8519	3.9303886	8552	3.9320677	8585	3.9337403
8520	3.9304396	8553	3.9321185	8586	3.9337909
8521	3.9304906	8554	3.9321692	8587	3.9338415
8522	3.9305415	8555	3.9322200	8588	3.9338920
8523	3.9305925	8556	3.9322708	8589	3.9339426
8524	3.9306434	8557	3.9323215	8590	3.9339932
8525	3.9306944	8558	3.9323723	8591	3.9340437
8526	3.9307453	8559	3.9324230	8592	3.9340943
8527	3.9307963	8560	3.9324738	8593	3.9341448
8528	3.9308472	8561	3.9325245	8594	3.9341953
8529	3.9308981	8562	3.9325752	8595	3.9342459
8530	3.8309490	8563	3.9326259	8596	3.9342964
8531	3.9309999	8564	3.9326767	8597	3.9343469
8532	3.9310508	8565	3.9327274	8598	3.9343974
8533	3.9311017	8566	3.9327781	8599	3.9344479
8534	3.9311526	8567	3.9328288	8600	3.9344984

8600

Num Logarithm	Num Logarithm	Num Logarithm
8601 3.9345489	8634 3.9362120	8667 3.9378688
8602 3.9345994	8635 3.9362623	8668 3.9379189
8603 3.9346499	8636 3.9363126	8669 3.9379690
8604 3.9347004	8637 3.9363629	8670 3.9380191
8605 3.9347509	8638 3.9364132	8671 3.9380692
8606 3.9348013	8639 3.9364635	8672 3.9381193
8607 3.9348518	8640 3.9365137	8673 3.9381693
8608 3.9349023	8641 3.9365640	8674 3.9382194
8609 3.9349527	8642 3.9366143	8675 3.9382695
8610 3.9350032	8643 3.9366645	8676 3.9383195
8611 3.9350536	8644 3.9367148	8677 3.9383696
8612 3.9351040	8645 3.9367650	8678 3.9384196
8613 3.9351544	8646 3.9368152	8679 3.9384697
8614 3.9352040	8647 3.9368655	8680 3.9385197
8615 3.9352553	8648 3.9369157	8681 3.9385698
8616 3.9353057	8649 3.9369659	8682 3.9386198
8617 3.9353561	8650 3.9370161	8683 3.9386698
8618 3.9354065	8651 3.9370663	8684 3.9387198
8619 3.9354569	8652 3.9371165	8685 3.9387698
8620 3.9355073	8653 3.9371667	8686 3.9388198
8621 3.9355576	8654 3.9372169	8687 3.9388698
8622 3.9356080	8655 3.9372671	8688 3.9389198
8623 3.9356584	8656 3.9373172	8689 3.9389698
8624 3.9357087	8657 3.9373674	8690 3.9390198
8625 3.9357591	8658 3.9374176	8691 3.9390697
8626 3.9358095	8659 3.9374677	8692 3.9391197
8627 3.9358598	8660 3.9375179	8693 3.9391697
8628 3.9359101	8661 3.9375680	8694 3.9392196
8629 3.9359605	8662 3.9376182	8695 3.9392696
8630 3.9360108	8663 3.9376683	8696 3.9393195
8631 3.9360611	8664 3.9377184	8697 3.9393695
8632 3.9361114	8665 3.9377686	8698 3.9394194
8633 3.9361617	8666 3.9378187	8699 3.9394693
8634 3.9362120	8667 3.9378688	8700 3.9395193

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8700

Num	Logarithm	Num	Logarithm	Num	Logarithm
8701	3.9395692	8734	3.9412132	8767	3.9428510
8702	3.9396191	8735	3.9412629	8768	3.9429005
8703	3.9396690	8736	3.9413126	8769	3.9429561
8704	3.9397189	8737	3.9413623	8770	3.9429996
8705	3.9397688	8738	3.9414120	8771	3.9400491
8706	3.9398187	8739	3.9414617	8772	3.9430986
8707	3.9398685	8740	3.9415114	8773	3.9431481
8708	3.9399184	8741	3.9415611	8774	3.9431976
8709	3.9399683	8742	3.9416108	8775	3.9432471
8710	3.9400182	8743	3.9416605	8776	3.9432966
8711	3.9400680	8744	3.9417101	8777	3.9433461
8712	3.9401179	8745	3.9417598	8778	3.9433956
8713	3.9401677	8746	3.9418095	8779	3.9434450
8714	3.9402176	8747	3.9418591	8780	3.9434945
8715	3.9402674	8748	3.9419088	8781	3.9435440
8716	3.9403172	8749	3.9419584	8782	3.9435934
8717	3.9403670	8750	3.9420081	8783	3.9436429
8718	3.9404169	8751	3.9420577	8784	3.9436923
8719	3.9404667	8752	3.9421073	8785	3.9437418
8720	3.9405165	8753	3.9421569	8786	3.9437912
8721	3.9405663	8754	3.9422065	8787	3.9438406
8722	3.9406161	8755	3.9422561	8788	3.9438900
8723	3.9406659	8756	3.9423058	8789	3.9439394
8724	3.9407157	8757	3.9423553	8790	3.9439889
8725	3.9407654	8758	3.9424049	8791	3.9440383
8726	3.9408152	8759	3.9424545	8792	3.9440877
8727	3.9408650	8760	3.9425041	8793	3.9441371
8728	3.9409147	8761	3.9425537	8794	3.9441865
8729	3.9409645	8762	3.9426032	8795	3.9442358
8730	3.9410142	8763	3.9426528	8796	3.9442852
8731	3.9410640	8764	3.9427024	8797	3.9443346
8732	3.9411137	8765	3.9427519	8798	3.9443840
8733	3.9411635	8766	3.9428015	8799	3.9444333
8734	3.9412132	8767	3.9428510	8800	3.9444820

8800

Num	Logarithm	Num	Logarithm	Num	Logarithm
8801	3.9445320	8834	3.9461574	8867	3.9477767
8802	3.9445814	8835	3.9462066	8868	3.9478257
8803	3.9446307	8836	3.9462557	8869	3.9478747
8804	3.9446800	8837	3.9463048	8870	3.9479236
8805	3.9447294	8838	3.9463540	8871	3.9479726
8806	3.9447787	8839	3.9464031	8872	3.9480215
8807	3.9448280	8840	3.9464523	8873	3.9480705
8808	3.9448773	8841	3.9465014	8874	3.9481194
8809	3.9449266	8842	3.9465505	8875	3.9481684
8810	3.9449759	8843	3.9465996	8876	3.9482173
8811	3.9450252	8844	3.9466487	8877	3.9482662
8812	3.9450745	8845	3.9466978	8878	3.9483151
8813	3.9451238	8846	3.9467469	8879	3.9483641
8814	3.9451730	8847	3.9467960	8880	3.9484130
8815	3.9452223	8848	3.9468451	8881	3.9484619
8816	3.9452716	8849	3.9468942	8882	3.9485108
8817	3.9453208	8850	3.9469433	8883	3.9485597
8818	3.9453701	8851	3.9469923	8884	3.9486085
8819	3.9454193	8852	3.9470414	8885	3.9486574
8820	3.9454686	8853	3.9470905	8886	3.9487063
8821	3.9455178	8854	3.9471395	8887	3.9487552
8822	3.9455671	8855	3.9471886	8888	3.9488040
8823	3.9456163	8856	3.9472376	8889	3.9488529
8824	3.9456655	8857	3.9472866	8890	3.9489018
8825	3.9457147	8858	3.9473357	8891	3.9489506
8826	3.9457639	8859	3.9473847	8892	3.9489995
8827	3.9458131	8860	3.9474337	8893	3.9490483
8828	3.9458623	8861	3.9474827	8894	3.9490971
8829	3.9459115	8862	3.9475317	8895	3.9491460
8830	3.9459607	8863	3.9475807	8896	3.9491948
8831	3.9460099	8864	3.9476297	8897	3.9492436
8832	3.9460591	8865	3.9476787	8898	3.9492924
8833	3.9461082	8866	3.9477277	8899	3.9493412
8834	3.9461574	8867	3.9477767	8900	3.9493900

Num	Logarithm	Num	Logarithm	Num	Logarithm
8901	3.9494388	8934	3.9510459	8967	3.9526472
8902	3.9494876	8935	3.9510946	8968	3.9526956
8903	3.9495364	8936	3.9511432	8969	3.9527440
8904	3.9495852	8937	3.9511918	8970	3.9527924
8905	3.9496339	8938	3.9512404	8971	3.9528409
8906	3.9496827	8939	3.9512889	8972	3.9528893
8907	3.9497315	8940	3.9513375	8973	3.9529377
8908	3.9497802	8941	3.9513861	8974	3.9529861
8909	3.9498290	8942	3.9514347	8975	3.9530345
8910	3.9498777	8943	3.9514832	8976	3.9530828
8911	3.9499264	8944	3.9515318	8977	3.9531312
8912	3.9499752	8945	3.9515803	8978	3.9531796
8913	3.9500239	8946	3.9516289	8979	3.9532280
8914	3.9500726	8947	3.9516774	8980	3.9532763
8915	3.9501213	8948	3.9517260	8981	3.9533247
8916	3.9501701	8949	3.9517745	8982	3.9533730
8917	3.9502188	8950	3.9518230	8983	3.9534214
8918	3.9502675	8951	3.9518716	8984	3.9534697
8919	3.9503162	8952	3.9519201	8985	3.9535181
8920	3.9503649	8953	3.9519686	8986	3.9535664
8921	3.9504135	8954	3.9520171	8987	3.9536147
8922	3.9504622	8955	3.9520656	8988	3.9536631
8923	3.9505109	8956	3.9521141	8989	3.9537114
8924	3.9505596	8957	3.9521626	8990	3.9537597
8925	3.9506082	8958	3.9522111	8991	3.9538080
8926	3.9506569	8959	3.9522595	8992	3.9538563
8927	3.9507055	8960	3.9523080	8993	3.9539046
8928	3.9507542	8961	3.9523565	8994	3.9539529
8929	3.9508028	8962	3.9524049	8995	3.9540012
8930	3.9508515	8963	3.9524534	8996	3.9540494
8931	3.9509001	8964	3.9525018	8997	3.9540977
8932	3.9509487	8965	3.9525503	8998	3.9541460
8933	3.9509973	8966	3.9525987	8999	3.9541943
8934	3.9510459	8967	3.9526472	9000	3.9542425

Num	Logarithm	Num	Logarithm	Num	Logarithm
9001	3.9542908	9034	3.9558801	9067	3.9574636
9002	3.9543390	9035	3.9559282	9068	3.9575115
9003	3.9543872	9036	3.9559762	9069	3.9575594
9004	3.9544355	9037	3.9560243	9070	3.9576073
9005	3.9544837	9038	3.9560723	9071	3.9576552
9006	3.9545319	9039	3.9561204	9072	3.9577030
9007	3.9545802	9040	3.9561684	9073	3.9577509
9008	3.9546284	9041	3.9562165	9074	3.9577988
9009	3.9546766	9042	3.9562645	9075	3.9578466
9010	3.9547248	9043	3.9563125	9076	3.9578945
9011	3.9547730	9044	3.9563606	9077	3.9579423
9012	3.9548212	9045	3.9564086	9078	3.9579902
9013	3.9548694	9046	3.9564566	9079	3.9580380
9014	3.9549176	9047	3.9565046	9080	3.9580858
9015	3.9549657	9048	3.9565526	9081	3.9581337
9016	3.9550139	9049	3.9566006	9082	3.9581815
9017	3.9550621	9050	3.9566486	9083	3.9582293
9018	3.9551102	9051	3.9566966	9084	3.9582771
9019	3.9551584	9052	3.9567445	9085	3.9583249
9020	3.9552065	9053	3.9567925	9086	3.9583727
9021	3.9552547	9054	3.9568405	9087	3.9584205
9022	3.9553028	9055	3.9568885	9088	3.9584683
9023	3.9553510	9056	3.9569364	9089	3.9585161
9024	3.9553991	9057	3.9569844	9090	3.9585639
9025	3.9554472	9058	3.9570323	9091	3.9586117
9026	3.9554953	9059	3.9570803	9092	3.9586594
9027	3.9555434	9060	3.9571282	9093	3.9587072
9028	3.9555915	9061	3.9571761	9094	3.9587549
9029	3.9556397	9062	3.9572241	9095	3.9588027
9030	3.9556877	9063	3.9572720	9096	3.9588505
9031	3.9557358	9064	3.9573199	9097	3.9588982
9032	3.9557839	9065	3.9573678	9098	3.9589459
9033	3.9558320	9066	3.9574157	9099	3.9589937
9034	3.9558801	9067	3.9574636	9100	3.9590414

Num	Logarithm	Num	Logarithm	Num	Logarithm
9101	3.9590891	9134	3.9606610	9167	3.9622272
9102	3.9591368	9135	3.9607086	9168	3.9622746
9103	3.9591845	9136	3.9607561	9169	3.9623220
9104	3.9592322	9137	3.9608036	9170	3.9623693
9105	3.9592799	9138	3.9608512	9171	3.9624167
9106	3.9593276	9139	3.9608987	9172	3.9624640
9107	3.9593753	9140	3.9609462	9173	3.9625114
9108	3.9594230	9141	3.9609937	9174	3.9625587
9109	3.9594707	9142	3.9610412	9175	3.9626061
9110	3.9595184	9143	3.9610887	9176	3.9626534
9111	3.9595660	9144	3.9611362	9177	3.9627007
9112	3.9596137	9145	3.9611837	9178	3.9627481
9113	3.9596614	9146	3.9612312	9179	3.9627954
9114	3.9597090	9147	3.9612787	9180	3.9628427
9115	3.9597567	9148	3.9613262	9181	3.9628900
9116	3.9598043	9149	3.9613736	9182	3.9629373
9117	3.9598520	9150	3.9614211	9183	3.9629846
9118	3.9598996	9151	3.9614686	9184	3.9630319
9119	3.9599472	9152	3.9615160	9185	3.9630792
9120	3.9599948	9153	3.9615635	9186	3.9631264
9121	3.9600425	9154	3.9616109	9187	3.9631737
9122	3.9600901	9155	3.9616583	9188	3.9632210
9123	3.9601377	9156	3.9617058	9189	3.9632683
9124	3.9601853	9157	3.9617532	9190	3.9633155
9125	3.9602329	9158	3.9618006	9191	3.9633628
9126	3.9602805	9159	3.9618481	9192	3.9634100
9127	3.9603280	9160	3.9618955	9193	3.9634573
9128	3.9603756	9161	3.9619429	9194	3.9635045
9129	3.9604232	9162	3.9619903	9195	3.9635517
9130	3.9604708	9163	3.9620377	9196	3.9635990
9131	3.9605183	9164	3.9620851	9197	3.9636462
9132	3.9605659	9165	3.9621325	9198	3.9636934
9133	3.9606135	9166	3.9621799	9199	3.9637406
9134	3.9606610	9167	3.9622272	9200	3.9637878

Num	Logarithm	Num	Logarithm	Num	Logarithm
9201	3.9638350	9234	3.9653899	9267	3.9669392
9202	3.9638822	9235	3.9654369	9268	3.9669860
9203	3.9639264	9236	3.9654839	9269	3.9670329
9204	3.9639766	9237	3.9655309	9270	3.9670797
9205	3.9640238	9238	3.9655780	9271	3.9671266
9206	3.9640710	9239	3.9656250	9272	3.9671734
9207	3.9641181	9240	3.9656720	9273	3.9672203
9208	3.9641653	9241	3.9657190	9274	3.9672671
9209	3.9642125	9242	3.9657660	9275	3.9673139
9210	3.9642596	9243	3.9658130	9276	3.9673607
9211	3.9643068	9244	3.9658599	9277	3.9674076
9212	3.9643539	9245	3.9659069	9278	3.9674544
9213	3.9644011	9246	3.9659539	9279	3.9675012
9214	3.9644482	9247	3.9660009	9280	3.9675480
9215	3.9644953	9248	3.9660478	9281	3.9675948
9216	3.9645425	9249	3.9660948	9282	3.9676416
9217	3.9645896	9250	3.9661417	9283	3.9676883
9218	3.9646367	9251	3.9661887	9284	3.9677351
9219	3.9646838	9252	3.9662356	9285	3.9677819
9220	3.9647309	9253	3.9662826	9286	3.9678287
9221	3.9647780	9254	3.9663295	9287	3.9678754
9222	3.9648251	9255	3.9663764	9288	3.9679222
9223	3.9648722	9256	3.9664233	9289	3.9679690
9224	3.9649193	9257	3.9664703	9290	3.9680157
9225	3.9649664	9258	3.9665172	9291	3.9680625
9226	3.9650134	9259	3.9665641	9292	3.9681092
9227	3.9650605	9260	3.9666110	9293	3.9681559
9228	3.9651076	9261	3.9666579	9294	3.9682027
9229	3.9651546	9262	3.9667048	9295	3.9682494
9230	3.9652017	9263	3.9667517	9296	3.9682961
9231	3.9652488	9264	3.9667985	9297	3.9683428
9232	3.9652958	9265	3.9668454	9298	3.9683895
9233	3.9653428	9266	3.9668923	9299	3.9684362
9234	3.9653899	9267	3.9669392	9300	3.9684829

Num	Logarithm	Num	Logarithm	Num	Logarithm
9301	3.9685296	9334	3.9700578	9367	3.9716005
9302	3.9685763	9335	3.9701143	9368	3.9716469
9303	3.9686230	9336	3.9701608	9369	3.9716932
9304	3.9686697	9337	3.9702074	9370	3.9717396
9305	3.9687164	9338	3.9702539	9371	3.9717859
9306	3.9687630	9339	3.9703004	9372	3.9718323
9307	3.9688097	9340	3.9703469	9373	3.9718786
9308	3.9688564	9341	3.9703934	9374	3.9719249
9309	3.9689030	9342	3.9704399	9375	3.9719713
9310	3.9689497	9343	3.9704863	9376	3.9720176
9311	3.9689963	9344	3.9705328	9377	3.9720639
9312	3.9690430	9345	3.9705793	9378	3.9721102
9313	3.9690896	9346	3.9706258	9379	3.9721565
9314	3.9691362	9347	3.9706722	9380	3.9722028
9315	3.9691829	9348	3.9707187	9381	3.9722491
9316	3.9692295	9349	3.9707652	9382	3.9722954
9317	3.9692761	9350	3.9708116	9383	3.9723417
9318	3.9693227	9351	3.9708581	9384	3.9723880
9319	3.9693693	9352	3.9709045	9385	3.9724343
9320	3.9694159	9353	3.9709509	9386	3.9724805
9321	3.9694625	9354	3.9709974	9387	3.9725268
9322	3.9695091	9355	3.9710438	9388	3.9725731
9323	3.9695557	9356	3.9710902	9389	3.9726193
9324	3.9696023	9357	3.9711366	9390	3.9726656
9325	3.9696488	9358	3.9711830	9391	3.9727118
9326	3.9696954	9359	3.9712294	9392	3.9727581
9327	3.9697420	9360	3.9712758	9393	3.9728043
9328	3.9697885	9361	3.9713222	9394	3.9728506
9329	3.9698351	9362	3.9713686	9395	3.9728968
9330	3.9698816	9363	3.9714150	9396	3.9729430
9331	3.9699282	9364	3.9714614	9397	3.9729892
9332	3.9699747	9365	3.9715078	9398	3.9730354
9333	3.9700213	9366	3.9715542	9399	3.9730816
9334	3.9700678	9367	3.9716005	9400	3.9731279

Num	Logarithm	Num	Logarithm	Num	Logarithm
9401	3.9731741	9434	3.9746959	9467	3.9762124
9402	3.9732202	9435	3.9747419	9468	3.9762582
9403	3.9732664	9436	3.9747879	9469	3.9763041
9404	3.9733126	9437	3.9748340	9470	3.9763500
9405	3.9733588	9438	3.9748800	9471	3.9763958
9406	3.9734050	9439	3.9749260	9472	3.9764417
9407	3.9734511	9440	3.9749720	9473	3.9764875
9408	3.9734973	9441	3.9750180	9474	3.9765335
9409	3.9735435	9442	3.9750640	9475	3.9765792
9410	3.9735896	9443	3.9751100	9476	3.9766251
9411	3.9736358	9444	3.9751560	9477	3.9766709
9412	3.9736819	9445	3.9752020	9478	3.9767167
9413	3.9737281	9446	3.9752479	9479	3.9767625
9414	3.9737742	9447	3.9752939	9480	3.9768083
9415	3.9738203	9448	3.9753399	9481	3.9768541
9416	3.9738664	9449	3.9753858	9482	3.9768999
9417	3.9739126	9450	3.9754318	9483	3.9769457
9418	3.9739587	9451	3.9754778	9484	3.9769915
9419	3.9740048	9452	3.9755237	9485	3.9770373
9420	3.9740509	9453	3.9755697	9486	3.9770831
9421	3.9740970	9454	3.9756156	9487	3.9771289
9422	3.9741431	9455	3.9756615	9488	3.9771747
9423	3.9741892	9456	3.9757075	9489	3.9772200
9424	3.9742353	9457	3.9757534	9490	3.9772662
9425	3.9742814	9458	3.9757993	9491	3.9773120
9426	3.9743274	9459	3.9758452	9492	3.9773577
9427	3.9743735	9460	3.9758911	9493	3.9774035
9428	3.9744196	9461	3.9759370	9494	3.9774492
9429	3.9744656	9462	3.9759829	9495	3.9774950
9430	3.9745117	9463	3.9760288	9496	3.9775407
9431	3.9745577	9464	3.9760747	9497	3.9775864
9432	3.9746038	9465	3.9761206	9498	3.9776322
9433	3.9746498	9466	3.9761665	9499	3.9776779
9434	3.9746959	9467	3.9762124	9500	3.9777236

Num	Logarithm	Num	Logarithm	Num	Logarithm
9501	3.9777623	9534	3.9792751	9567	3.9807758
9502	3.9778150	9535	3.9793207	9568	3.9808212
9503	3.9778607	9536	3.9793662	9569	3.9808666
9504	3.9779064	9537	3.9794118	9570	3.9809119
9505	3.9779521	9538	3.9794573	9571	3.9809573
9506	3.9779978	9539	3.9795028	9572	3.9810027
9507	3.9780435	9540	3.9795484	9573	3.9810481
9508	3.9780892	9541	3.9795939	9574	3.9810934
9509	3.9781348	9542	3.9796394	9575	3.9811388
9510	3.9781805	9543	3.9796849	9576	3.9811841
9511	3.9782262	9544	3.9797304	9577	3.9812295
9512	3.9782718	9545	3.9797759	9578	3.9812748
9513	3.9783175	9546	3.9798214	9579	3.9813202
9514	3.9783631	9547	3.9798669	9580	3.9813655
9515	3.9784088	9548	3.9799124	9581	3.9814108
9516	3.9784544	9549	3.9799579	9582	3.9814562
9517	3.9785001	9550	3.9800034	9583	3.9815015
9518	3.9785457	9551	3.9800488	9584	3.9815468
9519	3.9785913	9552	3.9800943	9585	3.9815921
9520	3.9786369	9553	3.9801398	9586	3.9816374
9521	3.9786826	9554	3.9801852	9587	3.9816827
9522	3.9787282	9555	3.9802307	9588	3.9817280
9523	3.9787738	9556	3.9802761	9589	3.9817723
9524	3.9788194	9557	3.9803216	9590	3.9818186
9525	3.9788650	9558	3.9803670	9591	3.9818639
9526	3.9789105	9559	3.9804125	9592	3.9819092
9527	3.9789562	9560	3.9804579	9593	3.9819544
9528	3.9790017	9561	3.9805033	9594	3.9819997
9529	3.9790473	9562	3.9805487	9595	3.9820450
9530	3.9790929	9563	3.9805942	9596	3.9820902
9531	3.9791385	9564	3.9806396	9597	3.9821355
9532	3.9791840	9565	3.9806850	9598	3.9821807
9533	3.9792296	9566	3.9807304	9599	3.9822260
9534	3.9792751	9567	3.9807758	9600	3.9822712

9600

Num	Logarithm	Num	Logarithm	Num	Logarithm
9601	3.9823165	9634	3.9838066	9667	3.9852917
9602	3.9823617	9635	3.9838517	9668	3.9853366
9603	3.9824069	9636	3.9838968	9669	3.9853816
9604	3.9824522	9637	3.9839419	9670	3.9854265
9605	3.9824974	9638	3.9839869	9671	3.9854714
9606	3.9825426	9639	3.9840320	9672	3.9855163
9607	3.9825878	9640	3.9840770	9673	3.9855612
9608	3.9826330	9641	3.9841221	9674	3.9856061
9609	3.9826782	9642	3.9841671	9675	3.9856510
9610	3.9827234	9643	3.9842122	9676	3.9856959
9611	3.9827686	9644	3.9842572	9677	3.9857407
9612	3.9828138	9645	3.9843022	9678	3.9857856
9613	3.9828589	9646	3.9843473	9679	3.9858305
9614	3.9829041	9647	3.9843923	9680	3.9858754
9615	3.9829493	9648	3.9844373	9681	3.9859202
9616	3.9829945	9649	3.9844823	9682	3.9859651
9617	3.9830396	9650	3.9845273	9683	3.9860099
9618	3.9830848	9651	3.9845723	9684	3.9860548
9619	3.9831299	9652	3.9846173	9685	3.9860996
9620	3.9831751	9653	3.9846623	9686	3.9861445
9621	3.9832202	9654	3.9847073	9687	3.9861893
9622	3.9832654	9655	3.9847523	9688	3.9862341
9623	3.9833105	9656	3.9847973	9689	3.9862790
9624	3.9833556	9657	3.9848422	9690	3.9863238
9625	3.9834007	9658	3.9848872	9691	3.9863686
9626	3.9834459	9659	3.9849322	9692	3.9864134
9627	3.9834910	9660	3.9849771	9693	3.9864582
9628	3.9835361	9661	3.9850221	9694	3.9865030
9629	3.9835812	9662	3.9850670	9695	3.9865478
9630	3.9836263	9663	3.9851120	9696	3.9865926
9631	3.9836714	9664	3.9851569	9697	3.9866374
9632	3.9837165	9665	3.9852019	9698	3.9866822
9633	3.9837616	9666	3.9852468	9699	3.9867270
9634	3.9838066	9667	3.9852917	9700	3.9867717

9700

9700

Num	Logarithm	Num	Logarithm	Num	Logarithm
9701	3.9868165	9734	3.9882913	9767	3.9897612
9702	3.9868613	9735	3.9883360	9768	3.9898056
9703	3.9869060	9736	3.9883806	9769	3.9898501
9704	3.9869508	9737	3.9884252	9770	3.9898946
9705	3.9869955	9738	3.9884698	9771	3.9899390
9706	3.9870403	9739	3.9885144	9772	3.9899835
9707	3.9870850	9740	3.9885590	9773	3.9900279
9708	3.9871298	9741	3.9886035	9774	3.9900723
9709	3.9871745	9742	3.9886481	9775	3.9901168
9710	3.9872192	9743	3.9886927	9776	3.9901612
9711	3.9872640	9744	3.9887373	9777	3.9902056
9712	3.9873087	9745	3.9887818	9778	3.9902500
9713	3.9873534	9746	3.9888264	9779	3.9902944
9714	3.9873981	9747	3.9888710	9780	3.9903389
9715	3.9874428	9748	3.9889155	9781	3.9903833
9716	3.9874875	9749	3.9889601	9782	3.9904277
9717	3.9875322	9750	3.9890046	9783	3.9904721
9718	3.9875769	9751	3.9890492	9784	3.9905164
9719	3.9876216	9752	3.9890937	9785	3.9905608
9720	3.9876663	9753	3.9891382	9786	3.9906052
9721	3.9877109	9754	3.9891828	9787	3.9906496
9722	3.9877556	9755	3.9892275	9788	3.9906940
9723	3.9878003	9756	3.9892718	9789	3.9907383
9724	3.9878449	9757	3.9893163	9790	3.9907827
9725	3.9878896	9758	3.9893608	9791	3.9908270
9726	3.9879343	9759	3.9894053	9792	3.9908714
9727	3.9879789	9760	3.9894498	9793	3.9909158
9728	3.9880236	9761	3.9894943	9794	3.9909601
9729	3.9880682	9762	3.9895388	9795	3.9910044
9730	3.9881128	9763	3.9895833	9796	3.9910488
9731	3.9881575	9764	3.9896278	9797	3.9910931
9732	3.9882021	9765	3.9896722	9798	3.9911374
9733	3.9882467	9766	3.9897167	9799	3.9911818
9734	3.9882913	9767	3.9897612	9800	3.9912261

9800

Num	Logarithm	Num	Logarithm	Num	Logarithm
9801	3.9912704	9834	3.9927302	9867	3.9941851
9802	3.9913147	9835	3.9927744	9868	3.9942291
9803	3.9913590	9836	3.9928185	9869	3.9942731
9804	3.9914033	9837	3.9928627	9870	3.9943172
9805	3.9914476	9838	3.9929068	9871	3.9943612
9806	3.9914919	9839	3.9929510	9872	3.9944051
9807	3.9915362	9840	3.9929951	9873	3.9944491
9808	3.9915805	9841	3.9930392	9874	3.9944931
9809	3.9916247	9842	3.9930834	9875	3.9945371
9810	3.9916690	9843	3.9931275	9876	3.9945811
9811	3.9917133	9844	3.9931716	9877	3.9946251
9812	3.9917575	9845	3.9932157	9878	3.9946690
9813	3.9918018	9846	3.9932598	9879	3.9947130
9814	3.9918461	9847	3.9933039	9880	3.9947569
9815	3.9918903	9848	3.9933480	9881	3.9948009
9816	3.9919345	9849	3.9933921	9882	3.9948448
9817	3.9919788	9850	3.9934362	9883	3.9948888
9818	3.9920230	9851	3.9934803	9884	3.9949327
9819	3.9920673	9852	3.9935244	9885	3.9949766
9820	3.9921115	9853	3.9935685	9886	3.9950206
9821	3.9921557	9854	3.9936126	9887	3.9950645
9822	3.9921999	9855	3.9936566	9888	3.9951085
9823	3.9922441	9856	3.9937007	9889	3.9951524
9824	3.9922884	9857	3.9937448	9890	3.9951963
9825	3.9923326	9858	3.9937888	9891	3.9952402
9826	3.9923768	9859	3.9938329	9892	3.9952841
9827	3.9924210	9860	3.9938769	9893	3.9953280
9828	3.9924651	9861	3.9939210	9894	3.9953719
9829	3.9925093	9862	3.9939650	9895	3.9954158
9830	3.9925535	9863	3.9940090	9896	3.9954597
9831	3.9925977	9864	3.9940531	9897	3.9955034
9832	3.9926419	9865	3.9940971	9898	3.9955474
9833	3.9926860	9866	3.9941411	9899	3.9955913
9834	3.9927302	9867	3.9941851	9900	3.9956352

Num	Logarithm	Num	Logarithm	Num	Logarithm
9901	3.9956791	9934	3.9971242	9967	3.9985645
9902	3.9957229	9935	3.9971679	9968	3.9986080
9903	3.9957668	9936	3.9972116	9969	3.9986516
9904	3.9958106	9937	3.9972553	9970	3.9986952
9905	3.9958545	9938	3.9972990	9971	3.9987387
9906	3.9958983	9939	3.9973427	9972	3.9987823
9907	3.9959422	9940	3.9973864	9973	3.9988258
9908	3.9959860	9941	3.9974301	9974	3.9988694
9909	3.9960298	9942	3.9974738	9975	3.9989129
9910	3.9960737	9943	3.9975174	9976	3.9989564
9911	3.9961175	9944	3.9975611	9977	3.9990000
9912	3.9961613	9945	3.9976048	9978	3.9990435
9913	3.9962051	9946	3.9976485	9979	3.9990870
9914	3.9962489	9947	3.9976921	9980	3.9991305
9915	3.9962927	9948	3.9977358	9981	3.9991741
9916	3.9963365	9949	3.9977794	9982	3.9992176
9917	3.9963803	9950	3.9978231	9983	3.9992611
9918	3.9964241	9951	3.9978667	9984	3.9993046
9919	3.9964679	9952	3.9979104	9985	3.9993481
9920	3.9965117	9953	3.9979540	9986	3.9993916
9921	3.9965554	9954	3.9979976	9987	3.9994350
9922	3.9965992	9955	3.9980413	9988	3.9994785
9923	3.9966430	9956	3.9980849	9989	3.9995220
9924	3.9966868	9957	3.9981285	9990	3.9995655
9925	3.9967305	9958	3.9981721	9991	3.9996090
9926	3.9967743	9959	3.9982157	9992	3.9996524
9927	3.9968180	9960	3.9982593	9993	3.9996959
9928	3.9968618	9961	3.9983029	9994	3.9997393
9929	3.9969055	9962	3.9983465	9995	3.9997828
9930	3.9969492	9963	3.9983901	9996	3.9998262
9931	3.9969930	9964	3.9984337	9997	3.9998697
9932	3.9970367	9965	3.9984773	9998	3.9999131
9933	3.9970804	9966	3.9985209	9999	3.9999566
9934	3.9971242	9967	3.9985645	10000	4.0000000

The End of the Logarithms.



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